Access and Absence: A Quasi-Experimental Study of the Effect of North Carolina School Health Centers on Student Absenteeism[1]

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Abstract

The first school-based health center (SBHC) was introduced in North Carolina in Greene County in 1983. Over the last thirty years, School Health Centers (SHCs), which include school-based, school-linked, mobile units and telemedicine units, have been introduced into over 80, primarily rural, public schools in 28 counties. Some of these centers have closed in recent years due to budget cuts and competing priorities for limited funding. Given the scant amount of research on the effectiveness of SBHCs in North Carolina, the difficulty in generalizing findings from other studies to this state, and the increased pressure on wraparound services to demonstrate their ability to improve student academic performance, this paper serves as a first step toward providing policy makers with a fuller sense of the effect of SHCs in NC on reducing rates of student absenteeism. Using the timing of student entry and exit from schools combined with changes in health services available from year to year as a result of these school transitions, I estimate how enrollment in schools with primary care health services affects student absenteeism. Results from Poisson regression models indicate that SHCs reduce student absenteeism: students who transition from a school without a SHC to a school with a SHC miss, on average, 8.2 percent fewer days of school in the year of transition. By contrast, students who move to schools with less robust health services miss 13.2 percent more days of school in the year of transition. Students eligible for free and reduced price lunch and chronically absent students benefit even more from SHCs, especially when the model of care is a school-based health center. These finding have important implications for public health and education policies aimed at improving the health and academic outcomes of North Carolina's most at-risk children.

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Executive Summary

The first school-based health center (SBHC) was introduced in North Carolina in Greene County in 1983. Over the last thirty years, School Health Centers (SHCs), which include school-based, school-linked, mobile units and telemedicine units, have been introduced in over 80, primarily rural, public schools in 28 counties. These centers provide a wide range of health care services, with many providing comprehensive primary and mental health care services, to populations with historically limited access to health care. Some of these centers have closed in recent years due to budget cuts and competing priorities for limited funding. Given the scant amount of research on the effectiveness of SHCs in North Carolina, the difficulty in generalizing findings from other studies to this state, and the increased pressure on wraparound services to demonstrate their ability to improve student academic performance, this paper serves as a first step toward providing policy makers with a greater understanding of the effect SHCs in North Carolina have on reducing rates of student absenteeism.

It is widely accepted that student absenteeism inhibits student learning and that children in poor health are more likely to miss school. Research shows that as the number of school days a student misses increases, academic achievement tends to decline. Studies on the relationship between SHCs and student absenteeism have been both limited in number and varied in their findings. Non-random assignment of SHCs in schools with high concentrations of students from low-income households, who are at increased risk for poor academic outcomes, makes assessing the effect of school health services on academic indicators difficult to accurately measure due to selection bias.

To address evaluation challenges created by selection bias, as well as by a lack of reliable attendance data pre-2006 (long after many SHCs were introduced in North Carolina), I take advantage of student transitions between schools to examine the effect of entering or leaving a school with more robust health services. I follow four cohorts of students from 2006 to 2012 as they transition between schools in counties where SHCs are located. Using the timing of student entry and exit from schools combined with changes in health services available from year to year as a result of these school transitions, I estimate how enrollment in schools with primary care health services affects student absenteeism.

Results from Poisson regression models indicate that SHCs are associated with moderate reductions in rates of student absenteeism. Students who transition from a school without a SHC to a school with a SHC miss, on average, 8.2 percent fewer days of school in the year of transition. By contrast, students who move to schools with less robust health services miss 13.2 percent more days of school in the year of transition. Students eligible for free and reduced price lunch and students with a history of chronic absenteeism benefit even more than the general student population from enrollment in schools with SHCs, especially if the model of care is a school-based health center. When these subgroups traditionally considered at higher risk for poor academic outcomes transition from schools without SHBCs to schools with SBHCs they miss, on average, 13.4 and 18.1 percent fewer days, respectively. These findings have important implications for public health and education policies aimed at improving the health and academic outcomes of North Carolina's most at-risk children.

Introduction

The first school-based health center (SBHC) was introduced in North Carolina in Greene County in 1983. Over the last thirty years, School Health Centers (SHCs), which include school-based, school-linked, mobile units and telemedicine units, have been introduced into over 80, primarily rural, public schools in 28 counties. These centers provide a wide range of health care services, with many providing comprehensive primary and mental health care services. Some of these centers have closed in recent years due to budget cuts and competing priorities for limited funding. Only about half of NC's SBHCs receive funding from the state. To reach additional schools in rural communities with available funds, some counties have decided to employ health service models that can serve multiple schools, including mobile health units, telemedicine, and school linked health centers (SLHC).

The national SBHC movement began out of recognition that (1) children from low-income households and children in rural communities often lack access to health care, (2) lack of access leads to poorer health outcomes, and (3) schools are ideally situated to address problems of access to health care since children spend a substantial part of their childhood in school buildings. Various factors, other than being uninsured, may lead to lack of access for children from low-income households or rural communities, including provider shortages, transportation issues, and work schedules for low-income or single-parent households.

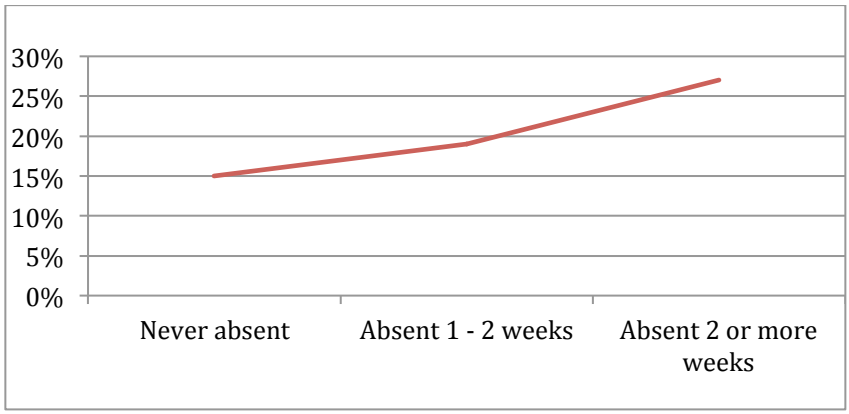
SBHCs are then, first and foremost, a public policy intervention aimed at addressing the problem of limited access to health care services for children. Additionally, some studies have found that SBHCs are effective at addressing barriers such as stigma and non-compliance (Bruns et al. 2005). The basic hypothesis behind SBHCs is that reducing barriers to accessing health care will improve the health of students, and that inasmuch as poor health impeded student learning, educational outcomes may also improve. In the words of the North Carolina School Community Health Alliance, SBHCs aim to "keep NC children healthy, in school, and ready to learn (NCSCHA 2010)."

One mechanism through which we may reasonably expect improved physical and behavioral health to lead to improved academic performance is through increased classroom presence. Missed classroom time from poor health may take the form of absences, or in the case of behavioral health, suspensions. The more classroom time a student misses due to health related issues, the less time a student has, relative to their peers, to benefit from classroom instruction.

While numerous studies have documented that SBHCs can mitigate barriers to health care access for low-income children (GAO 1994; Wade et al. 2008), studies on the relationship between SBHCs and student absenteeism have been both limited in number and divided in their findings (see Table 2 below). In North Carolina, only one study has examined this relationship, and it looked at only one alternative high school and middle school (McCord et al. 1993), severely limiting our ability to generalize its findings to the wider population. With the need for additional funding to support SBHCs, and increased pressure on such interventions to demonstrate a positive effect on academic performance, more research is needed.

School attendance is an essential component of student learning. Research shows that as the number of school days a student misses increases, academic achievement tends to decline (Fowler, Johnson, and Atkinson 1985; Balfanz and Byrnes 2012). Data collected by North Carolina's Child Health Assessment and Monitoring Program (CHAMP) support the link between student attendance and academic achievement, finding that between 2007 and 2009 (see Figure 1), students who missed two or more weeks of school were nearly twice as likely to make mostly C's, D's and F's as students who never missed school (NC State Center for Health Statistics 2011). While it is possible that poor academic performance can lead to increased absenteeism, research has established that increased absenteeism places students at greater risk for poor academic outcomes.

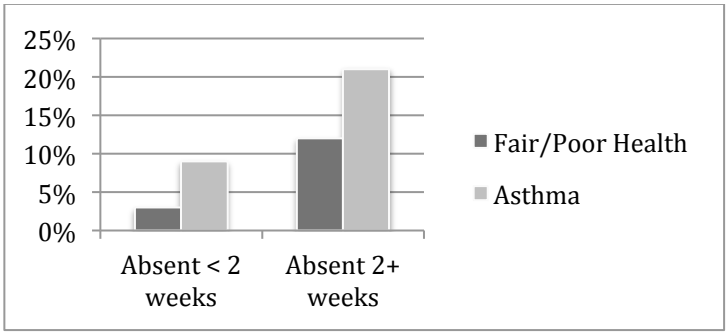
Figure 1: Percent of Students making mostly C's, D's, and F's increases with days absent



Source: NC State Center for Health Statistics

A child's health is an important predictor of school attendance and academic achievement. Children in poor health are more likely to miss school (Moonie 2008), and less likely to graduate high school (Haas and Fosse 2013). Asthma, the leading chronic health condition in the United States, results in more than 20 million days of missed school, or approximately 8 days per child with asthma(Telljohann, Dake, and Price 2004). The relationship between poor health and increased absenteeism is again reflected in data collected by CHAMP (Figure 2). For example, between 2007 and 2009, students in poor or fair health were three times as likely to miss two or more weeks of school(NC State Center for Health Statistics 2011) . Additionally, student absenteeism is more likely to affect children from low-income households, whom research indicates are more likely to have vision and hearing problems, untreated cavities, asthma, lead dust exposure, and unmet behavioral health needs, and are less likely to receive medical care than their middle class peers (Rothstein 2004; Guo, Wade, and Keller 2013).

Figure 2: Students absent 2 or more weeks are more likely to have poorer health.



Source: NC State Center for Health Statistics

The number of individual chronic health conditions among North Carolina's student population has been on the rise (Appendix 1). Between 2005 and 2011, the most recent year in which data are available, the number of chronic health conditions among children enrolled in public schools rose by 48 percent, from 197,052 to 292,288 (NCDHHS 2011). The growth in chronic conditions is likely due to multiple factors, including an increase in the number of some conditions, like diabetes, among children, an increase in the number of conditions being tracked by school nurses, and a decrease in the number of children with chronic conditions going undetected as a result of improved access to health services. According to the most recent estimate, 12.8 percent of students have at least one chronic health condition (NCDHHS 2011).

While poor physical health can lead to increased student absences, poor mental health, often undetected in children, can place children at increased risk of suspension and expulsion in addition to missed school days due to illness. It is estimated that at least one in five children suffer from mental disorders, and that only 20 percent of children suffering from mental illness are identified and receive the health services they require (Reback 2010). Mental health illnesses can arise as early as age seven (Masi and Cooper 2006), and disproportionately affect children from low-income households (Guo, Wade, and Keller 2013). The effects of mental illness on childhood outcomes are profound. For example, elementary school-aged children with mental illness are estimated to miss as many as 22 days of school per year, and their suspension and expulsion rates are three times higher than those of their peers (Masi and Cooper 2006). Some studies have found that out-of-school suspension (OSS) may actually exacerbate behavior problems (Bruns et al. 2005).

Chronic absenteeism, defined as missing more than 10 percent or 30 days of a school year for any reason, including suspensions, is especially concerning and often masked by Average Daily Attendance rates – the most common measure of truancy reported by schools. According to one national report, "a school can have average daily attendance of 90 percent and still have 40 percent of its students chronically absent, because on different days, different students make up that 90 percent" (Balfanz and Byrnes 2012). Students from low-income households are more likely than their middle class peers to be chronically absent. The same report also finds that chronic absenteeism is higher in earlier and later grades, and lowest in third through fifth grades.

School Health Centers in North Carolina

Schools that benefit from SHCs roughly mirror the demographic and geographic makeup of NC public schools. However, schools with SHCs are overrepresented by high schools and middle schools, and disproportionately serve economically disadvantaged students – both intentional aspects of center placement.

NC SHCs differ from one another in some important ways beyond school and county characteristics, including the length of time they have been in operation, their geographic location (urban vs. rural), the services they provide, the staffing models they use, the number of hours they are open per week, the percent of the student body utilizing their services, and whether they are open during weekends and summer break. The National Assembly of School-health Centers provided me with the raw data from the three most recent triennial surveys of North Carolina's SHCs (2004, 2007, and 2010). I used this data to provide a descriptive summary of key differences between SHCs in NC public schools (see Appendix 3), and also to identify and control for key differences in some of the longitudinal models discussed later in the paper. Some important differences include:

- **Year opened:** The first SHC in my sample opened in 1983. The remaining centers opened throughout the 1990s and 2000s. Most centers have been open ten or more years.
- **Number of hours open per week:** Hours of operation ranges from 8 to 40 per week.
- **Staffing model:** There are three major staffing models used by SBHCs in NC. Most use the most robust, comprehensive model that includes mental health services in addition to primary care.
- **Types of services provided.** SHCs provide a wide range of health services, especially in primary and mental health care. Appendix 3 provides a series of charts detailing the percent of SHCs by health service provided.
- **Percent of student body enrolled in SBHC:** Student body enrollment varies across SHCs due, in part, to parental consent. However, even at the 25th percentile, 60 percent of students are enrolled in the health center.
- **Receives state funding:** Currently half of all SBHCs receive funding from the state through a grant process.
- **Credentialed by state:** Some SBHCs are credentialed by the state, which enables centers to waive the requirement that students receive prior authorization from a primary care provider before the centers can reimburse Medicaid for services. The

study uses credentialed status as a quality control measure in some models to address the variation across centers.

- **Geographic location of center:** SBHCs are located in both urban and rural settings, with a majority located in the latter.

Table 1: NC SBHCs, Key Characteristics (2010-2011)

Characteristic	N	Mean	Median	25th percentile	75th percentile
Years opened	48	13.54	14	9	19
Hours per week	49	30.92	35	26	40
Percent of students enrolled	48	74.79%	79.10%	60.97%	96.34%

Source: NASHC, SBHC Census Report, 2010-2011. Calculated by author from raw data using STATA 12.

Table 2: NC SBHCs, Provider Model Employed (2010-2011)

Provider Model	Frequency	Percent
Primary Care Only	14	26.43
Primary Care/Mental Health	9	16.98
Primary Care/Mental Health Plus (comprehensive)	29	54.72
Other	1	1.89

Source: NASHC, SBHC Census Report, 2010-2011. Calculated by author from raw data using STATA 12.

Table 3: NC SBHCs, Services Provided (2010-2011)

Health Service	SHC Provides service		SHC Does not provide service	
	Individual	School-Wide	Individual	School-Wide
Violence Prevention	78.9%	51.9%	21.2%	48.1%
Emotional Health and Wellbeing	96.2%	40.4%	3.9%	59.6%
Chronic disease management	53.9%	46.2%	40.4%	59.6%
Academic Performance	71.2%	28.9%	17.3%	82.7%
Attendance	67.3%	17.3%	32.7%	82.7%
Pregnancy prevention	78.9%	15.4%	21.2%	84.6%
Dropout Prevention	67.3%	38.5%	32.7%	61.5%
N	52	52	52	52

Source: NASHC, SBHC Census Report, 2010-2011. Calculated by author from raw data using STATA 12

Noteworthy features of NC's SBHCs: In 2008, NC state-funded SBHCs recorded 75,261 encounters, serving 17,534 students. Of these visits, 79 percent were for primary care, with the remaining for mental health and nutrition. Over two-thirds of the registered students were uninsured or enrolled in public insurance (NCSCHA 2010).

NC, unlike many other states, provides support to SBHCs through a state level office in the Department of Health and Human Services. Support from the School Health Center Program comes in two major forms: direct financial support through grants and a credentialing program (North and Parker 2010). The credentialing program enables SBHCs to receive direct reimbursements for services provided to Medicaid beneficiaries, bypassing the normal requirement that students see a primary care provider first. The credentialing process is meant to ensure that SBHCs provide high quality, comprehensive health care. On-site visits and documentation are required that provide evidence that Quality Assurance Standards are met, comprehensive services are provided, and that appropriate state mandated processes are being followed, including the requirements that students obtain parental consent prior to accessing health services, and that the SBHC has an advisory board comprised of members of the school community (North and Parker 2010). Credentialed centers must seek renewal every three years. Budget cuts and reductions in DHHS staff dedicated to SBHCs have slowed the credentialing program in recent years.

While, nationally, state funding for SBHC's has nearly quadrupled over the past two decades, funding for SBHCs had decreased slightly in North Carolina over the past ten years. Between 2001 and 2009, the state provided approximately $1.5M per year to partially fund 28 of the 56 centers. On average, centers run on budgets of $250,000 per year, with revenue coming from an array of sources, including patient billing, foundation grants, state funds, and community support (NCSCHA 2010). In 2010, funding was cut, resulting in the closure of two SBHCs. The 2010 Patient Protection and Affordable Care Act (ACA), in recognition of the important role SBHCs can play in improving access to healthcare, set aside $200M for four years for capital projects; however, to date the federal government has not allocated any funding for the operational needs of SBHCs. The inconsistent funding of SBHCs is, in part, a reflection of the need for more research-based evidence on the benefits and cost-effectiveness of this model of healthcare provision (Parker 2010).

Previous Research on the Effect of SBHCs on Student Absenteeism

Studies on the relationship between SHCs and student absenteeism have been both limited in number and divided in their findings. A majority of studies evaluating the impact of SHCs are descriptive in nature. In 2003, Geierstanger et al. conducted a systematic literature review of all peer-reviewed, experimental or quasi-experimental studies that examined the relationship between SHCs and indicators of academic performance, including school attendance and suspensions. They found only six studies that met these criteria – all of them quasi-experimental. Using similar criteria, I found only four additional studies since the publication of their initial systematic review. Table 2 provides an overview and comparison of these studies, along with an additional study on the effect of school-based mental health services.

Table 4: Quasi-Experimental Evaluations of SBHCs and Academic Performance Indicators

Study Authors	Setting	Counterfactual & Sample Size	Absenteeism Rates
McCord et al (1993)	Alt MS and HS in NC	Users v. Non-users v. Non-enrollees (n=322)	**–**
Kisker & Brown (1996)	19 HS across nation	Attendees of SBHC (n=3,050) v. random national sample of non-attendees (n=859)	**0**
Gall et al. (2000)	Urban HS in NE setting	Users v. Non-users (n=383)	**–**
Warren & Fancsali (2000)	Multiple HS in NJ	Users v. Non-users (n=922)	**0**
Webber et al (2003)	Multiple ES in NYC	Attendees (n=645) v. non-attendees (304)	**–**
Williams (2003)	Multiple ES – HS in Dallas	Users (n=370 – 5,095) v. matched group of non-users (n=507 – 5,236)	**0**
Barnet et al (2004)ŦŦ	Alt HS in Baltimore	Users v. non-users (n=431)	**–**
Clark et al (2004) Ŧ	14 ES in Detroit	RCT (n=835)	**0**
Bruns et al.* (2005) Ŧ	82 ES in MD	School-based mental health v. no mental health services (n=41 schools each)	**–**
Walker et al. (2010) Ŧ	13 HS/3 Alt HS in Seattle	Users (n=444) v. non-users (n=1,861)	**–**
Van Cura (2010) Ŧ	2 urban HS in Western NY	Users v. Non-users and non-attendees (n= 764)	**–**

Source: Geierstanger et al (2004) supplemented with additional studies since 2004 by author (Ŧ).
– = Enrollment/participation in a SBHC is associated with a statistically significant decrease in the outcome of interest.
0 = The effect of enrollment/participation in a SBHC on the outcome of interest is statistically indistinguishable from zero.
N/A = Outcome not included in study. * = Mental Health Services only

The studies listed in Table 2 were conducted in a diverse array of geographic and school settings using various methodologies and counterfactual groups. Seven studies found SBHCs were associated with a decrease in student absenteeism, while no studies have found a statistically significant relationship between SBHCs and suspension rates. Studies have found positive effects on reduced absenteeism for: students with asthma enrolled in schools with SBHCs versus students with asthma enrolled in schools without a SBHC (Webber et al), students attending an alternative high school who used SBHC services versus those who did not (McCord et al), predominantly Hispanic SBHC enrollees referred to mental health services versus enrollees not referred to mental health services (Gall et al), pregnant teenagers receiving school-based prenatal care at one alternative school versus pregnant teenagers receiving non-school-based prenatal care (Barnet et al), high school students in Seattle who utilized SBHC services versus those who did not utilize the services (Walker et al), and students utilizing SBHC services in one high school in western NY when compared to another group of students enrolled in a school with only traditional nursing services (Van Cura).

While seven of the 11 studies find a positive effect associated with the presence of a SBHC on reducing student absenteeism, differences in the models of intervention, in the student populations served, and in the geographic location of the intervention limit our ability to generalize the findings to the broader North Carolina population. First, many of the studies examine populations that likely differ in important ways from the population of NC students enrolled in schools with SBHCs. Whereas many of NC's SBHCs are located in rural counties, most of the studies focus on urban areas, like Seattle and Detroit, or dissimilar regions of the country, like New England. Second, the only study set in NC examines one alternative high school (grades 6 – 12), a sample population both too small and too unrepresentative of the average NC student to warrant generalizing the findings of the study to the entire population served by the SBHCs. Finally, whereas most of the studies include multiple schools in the analysis, including one multi-state study, three of the 11 studies examine only one school. When you remove these three studies that examine only a single site and have relatively small sample sizes, the studies are evenly divided in their findings.

In examining the impact of SBHCs on indicators of academic performance, previous studies have used three main counterfactual group comparisons to establish how students would have performed in the absence of exposure to a SBHC:

1. **Attendees v. Non-Attendees:** Students attending schools with a SBHC versus students attending schools without a SBHC.
2. **Enrollees v. Non-enrollees:** Students attending a school with a SBHC and enrolled in the SBHC versus students attending the same school but not enrolled in the SBHC.
3. **Users v. Non-Users** (the most common counterfactual group): Students enrolled in a SBHC and using its services versus students not using SBHC services.

Each counterfactual grouping has strengths and limitations. Comparing outcomes for the first group can help account for possible positive spillover effects (students not using the health center may benefit from the improved health of their classmates who access the center); however, such a study design also makes it more difficult to detect an effect since some in the treatment group are not actually utilizing the services. The validity of this approach hinges on the degree to which the study can make a compelling case that the groups of students and schools are in fact similar with the exception of the SBHC.

While the other two approaches to constructing a counterfactual group help us better ascertain the effect of actually utilizing health services and better control for unobservable differences in schools (since students all attend the same school), they do so by comparing two groups of students that may differ in unobservable ways that are correlated with both academic outcomes and the probability of receiving treatment. For example, enrollment in NC SBHCs requires parental consent. As a result, students who do not enroll in SBHCs may differ in unobservable ways that bias the estimated effect size.

Many evaluations run into similar challenges that limit the ability of researchers to draw causal inferences. First, several studies include no baseline/pre-test data or examine outcomes over a very small time frame, from several months to a year. The lack of baseline data or the examinations of performance over very small windows of time make it more difficult to rule out other factors that may be driving student performance. Second, studies of student performance across multiple sites fail to account for heterogeneity in SBHC models when, in reality, SBHCs differ in many ways – including hours of operation, services offered, requirements for parental consent, and types of provider models – that may impact their effectiveness. Third, studies that compare users to non-users either do not take into

account ways in which these two groups may differ that could bias the estimate or use matching methods, like propensity scores (Walker et al), to create similar groups based on observable characteristics. The problem with any kind of matching technique is that it cannot account unobservable differences that may be correlated with both the treatment and the outcome of interest. Additional challenges in previous research on SBHCs include small sample sizes, the inability to access confidential data, the reliance on self-reported data as opposed to official medical or school records, the introduction of selection bias due to parental consent necessary for students to receive care, and attrition from studies as a result of highly transient populations (Silberberg and Cantor 2008).

Study design

Objective and Hypothesis

This paper examines the relationship between enrollment in a school that benefits from school health centers and student absenteeism. There were three main goals for this study: to examine whether (1) enrollment in a school with a SHC reduces rates of student absenteeism, (2) this effect differs by SHC type (based, linked, mobile, or telemedicine), and (3) SHCs benefit some student subgroups more than others.

I hypothesized students from low-income households, especially in rural areas, would miss fewer days of school upon entering a school with a SHC as a result of increased access to medical care compared to years prior to enrolling in the school. To test this hypothesis, I conducted a well-controlled, quasi-experimental longitudinal analysis using individual student-level panel data from 2006 to 2012. The study begins in 2006 because consistent and reliable attendance data for all NC public schools does not exist prior to the 2005-06 academic year. The fact that many SHCs have been in operation for over two decades, well before the start of reliable statewide attendance records, played a key role in shaping the study design. One method for evaluating the impact of SBHCs would be to examine changes in student performance in schools where SBHCs were placed by comparing student performance in that school just before and just after the introduction of a SBHC. However, in order to conduct such an analysis, it would have been necessary to have data in the year prior to the introduction of the SBHC. Given that attendance data is not available before 2006, I instead take advantage of student transitions between schools

to measure the effect of SHCs on changes in the number of days students miss, on average, per year.

Data

The data for this study comes from the following sources: (1) the North Carolina Education Research Data Center (NCERDC) housed at Duke University in collaboration with the NC Department of Public Instruction (DPI) for individual student-level and school-level data; (2) the National Census of School Health Centers administered every three years by the School-Based Health Alliance for data on key characteristics of NC's SHCs; and (3) the North Carolina School Community Health Alliance for data on where SHCs are located, what type of center is in operation in each location (SBHC, SLHC, mobile or telemedicine unit), and when each SHC in NC opened and closed. Appendix 4 provides a description of the decisions made in assembling the longitudinal dataset.

I assembled individual student-level panels for four cohorts of students – the cohorts of students in 4th and 7th grade in 2006, 2007, 2008, and 2009. Each cohort included all students in 4th and 7th grade in the counties where at least one School Health Center was located during the years 2006 to 2012. Each student had a unique identifier that allowed me to follow students for a four-year period as they moved from schools without a SHC to a school with a SHC (elementary to middle school transitions or middle school to high school transitions) or from schools with a SBHC to schools without a SBHC (mainly for elementary schools with SHCs). The study includes data for the number of days each student was absent per year, as well as each student's grade level, ethnicity, sex, free-reduced price lunch eligibility status, limited English proficient status, End-of-Grade reading and math test scores, and End-of-Course Algebra I and English I test scores. Table 5 provides an illustration of the structure of cohorts in the dataset by grade level

Table 5: Structure of cohorts in dataset

Cohort	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
2006	Grade 4	Grade 5	Grade 6	Grade 7			
	Grade 7	Grade 8	Grade 9	Grade 10			
2007		Grade 4	Grade 5	Grade 6	Grade 7		
		Grade 7	Grade 8	Grade 9	Grade 10		
2008			Grade 4	Grade 5	Grade 6	Grade 7	
			Grade 7	Grade 8	Grade 9	Grade 10	
2009				Grade 4	Grade 5	Grade 6	Grade 7
				Grade 7	Grade 8	Grade 9	Grade 10

Some attrition occurs throughout the study, likely as a result of students moving either to a LEA not included in this study, to a charter or private school, or to a school in another state. Approximately 20 percent of the students who start in each cohort are no longer observed in the sample at the end of four years. Table 6 below lists the number of students observed in each year for each cohort.

Table 6: Number of students observed in each year, by cohort

Cohort	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
2006	42,413	39,145	36,125	33,870			
2007		42,717	39,259	36,441	34,465		
2008			41,978	38,656	36,274	34,533	
2009				25,755	23,507	21,868	20,888

Each student is also connected with the school he or she attended during each year of the study. The school code uniquely identifies each school, and is consistent from year to year. For each school and in each year, the study includes data on the grade level served, the percent of the student body living in poverty, the geographic location of the school (city, suburban, town or rural), the percent of teachers with three years or less of experience, the

percent of short and long-term suspensions per 100 students, the school-wide EOG proficiency levels for reading and math, and the overall performance composite score.

Using data from the National Census of School Health Centers along with data provided by the North Carolina School Community Health Alliance, I identified all schools in NC that had a School Health Center in operation between 2006 and 2012. Centers were identified and coded by type (school-based, school-linked, mobile unit, or telemedicine unit), whether the center was credentialed by the state, by the number of years the center was in operation in each year, and by the number of hours per week worked by primary and mental health care providers. The latter was not available for all SHCs. The dataset also included the year that all centers opened and closed (see Appendix 6 for this data). While most of the SHCs were opened prior to the years included in this retrospective analysis, SHCs began operating in 12 schools and stopped operating in 7 schools due to budget cuts during the study's seven-year period. I matched data for each SHC with the school benefitting from its services in each year observed.

For the purpose of this study, it was possible to collect data that identified whether students were actually enrolled in SHCs or used the services provided by SHCs, only that students were enrolled in schools where SHC services were present. As such, the results that follow report only the Intent to Treat Estimate (ITT). An ITT estimate is policy relevant, however, as it provides an estimate of the treatment effect based on the fact that there will always be non-compliers or people who do not, for various reasons, utilize available services. Every child will not take advantage of the services provided by a SHC or be enrolled in one, and, given this, an ITT estimate provides us with school-wide effect of introducing a SHC into a high-need population. An ITT estimate that does not distinguish between users and non-users also takes into the account the possibility for positive spillover effects, which seem plausible given some of services offered by SHCs, such as flu shots.

Methodological Challenges

Selection Bias. SHCs in NC were not randomly placed in schools, nor were they placed using an arbitrary eligibility criterion (e.g. the schools with the highest concentration of Medicaid beneficiaries). Random assignment of SHCs, on a sufficiently large scale, would have meant that the schools served by SHCs were similar in observable

and unobservable ways to schools not served by SHCs. In such a scenario, pending potential problems with randomization failure and attrition, I could have simply compared outcomes between those schools with and without SHCs to determine the treatment effect. Likewise, if SHCs had been placed using an arbitrary eligibility cutoff, then I could have compared outcomes for students enrolled in schools just below and just above the cutoff using a quasi-experimental regression discontinuity design to mimic randomization.

In the absence of randomization, schools with SHCs and the students who attend them are likely different from schools without SHCs and the students who attend them, and these differences are also likely correlated with the number of school days students miss. We know from research, for example, that poverty places students at higher risk of poor health and absenteeism.

Data from this study confirms that SHCs are introduced into schools with high-need populations. Most notably, among the sample population, students that were enrolled in schools with SHCs at any point over the course of the study were, on average, significantly more likely to be eligible for free and reduced price lunch (FRL) than students who never entered a school with SHC. Students who were enrolled in a SHC at any time during the study also were enrolled in schools that, on average, had significantly higher concentrations of poverty among the student body, reported more crimes per 100 students, and were located in rural areas.

Table 7: Baseline descriptive comparison of students in study enrolled at any point in school with SHC and students who never enrolled in school with SHC (among counties with at least one SHC), 2006

Variable	Ever in school w/ SHC Mean (SD)	Never in school w/ SHC Mean (SD)	P-value
Student-Level			
FRL status	0.57	0.47	.000***
	(.004)	(.003)	
% Hispanic	0.81	0.99	.000***
	(.002)	(.002)	
% Black	0.30	0.29	.002***
	(.004)	(.003)	
% White	0.53	0.53	.563
	(.004)	(.003)	
EOG Reading	251.8	252.4	.07*
EOG Math	345.1	345.8	.125
School-Level			
Rural	.541	.244	.000***

Percent Poverty	.624	.538	.002***
Crimes per 100	.771	.620	.000**
N	14,111	21,863	

Source: Study sample data collected from NCERDC. Descriptive statistics calculated in STATA 12

I further confirmed the intentional placement of SHCs in high-need schools by examining differences in the sample population in three LEAs where SHCs were not introduced until the year after the study concluded (2013). In these three LEAs, SHCs were introduced in 2013 into schools with student populations that, on average, had significantly higher concentrations of black students, economically disadvantaged students and limited English proficient students (LEP), and lower levels of proficiency on EOG math and reading assessments than other schools in the same LEAs.

While it is possible to control for some of the differences between students and schools, other differences exist that are either unobservable or unmeasured, which may bias the estimated treatment effect. Differences, such as the presence of chronic health conditions, the educational attainment of parents, the number of hours per week parents work, the home environment, the number of hours a school nurse is present per week, the distance to the nearest provider who sees Medicaid beneficiaries, and the quality and quantity of additional student support services, may be correlated both with the presence of an SHC and the number of days a student is absent, biasing the results

One additional unobservable difference that may bias the estimate involves NC's requirement for parental consent. Not all students in schools with SHCs are actually enrolled in the SHC, and among those enrolled, not all actually use the services. NC requires parental consent for students to enroll in SHCs, a fact, which more than any other, makes a within school comparison of outcomes between users and non-users problematic. The inability of some students to secure parental consent may be correlated with other factors, like parent education, that also place students at increased risk of poor educational outcomes. At the same time, failure to differentiate between users and non-users may lead to underestimating the size of the treatment effect.

Heterogeneity in Treatment. As discussed above, NC SHCs, the main focus of this study, differ from one another in some important ways beyond school and student body characteristics that likely impact their effectiveness. These differences pose challenges both to the generalizability of findings from previous studies and to current efforts to study

the effect of SHCs across a cross-section of multiple schools. In recognition of the heterogeneity among health centers, I include indicator variables for schools benefiting from SBHCs, SLHCs, mobile units, and telemedicine units, in addition to a general indicator variable for the presence of any of the above health center types. I also include an indicator variable for centers credentialed by the state. Finally, I include continuous variables for the number of years the center was open in year *t* of the study, and for the number of primary and mental health care staff work hours per week for centers. Data for the latter was not available for all centers. These different treatment measures allow me to avoid analyzing SHCs as a uniform group.

Methodology

To address the inherent endogeneity between health care access, student health, academic indicators, and SHC placement, I use the variation in student exposure to health care services that is driven by structural transitions between schools with and schools without SHCs. By making use of longitudinal data, I can control for time-invariant unobservable differences with the inclusion of student fixed effects, thereby greatly reducing any bias associated with non-random assignment.

The longitudinal study design takes advantage of transition years to create a counterfactual group of students who do not transition into or out of a school with a SHC (i.e., they never attend a school that has a SHC). The counterfactual group can be subdivided into two main groupings in relation to the treatment group: those who attended the same school as those in the treatment group that lacked a SHC but transitioned to a different school than the treatment group (that still lacked a SHC); and those who attended different schools from the treatment group throughout the duration of the study.

One possible concern in taking advantage of transitions between schools to estimate the effect of a program is that a structural school change might, in itself, contribute to changes in rates of student absenteeism. Several studies have found that (1) the structural change from elementary to middle school is associated with statistically significant declines in academic performance, including increased absenteeism, and that (2) while the transition to high school is associated with a less precipitous drop in student performance,

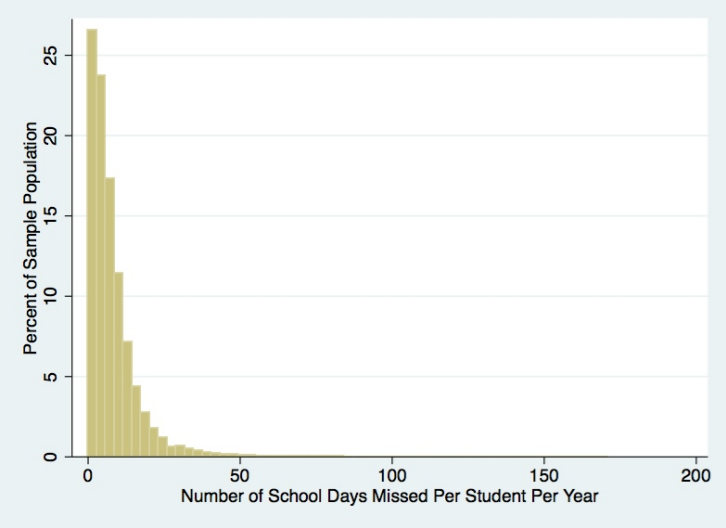
the previous experience of school transition in middle school only minimally mitigates, if at all, the loss associated with structural school transitions (Schwerdt and West 2013; Gordon 2011). To account for the impact of structural school transitions, I follow students who transition from the same feeder school to different schools within the same county, only some of which have SHCs. I also followed cohorts who transitioned into schools where SHCs were introduced during the time period examined by this study. SHCs were introduced at 12 schools and closed at 7 schools during the study's seven-year period. This added variation, coupled with the fact that students from the same school transition to different schools, helps isolate the effect of structural changes on rates of absenteeism.

An additional concern with estimating the change in the number of school days student miss as the key outcome of interest, is that absences are not normally distributed (see Figure 3 below for distribution of days absent). In a typical school year, most students are absent very few days, and many miss no days at all. By contrast, a much smaller group of student may miss a month or more school. Figure 3 illustrates how highly skewed the distribution of days absent is in the study sample, with many students missing zero days of school and a small number of students missing over 150 days per school year. In order to model the effect of enrollment in schools with SHCs on the number of days students are absent (a count variable), I use a Poisson regression, which accounts for highly skewed distributions where many observations are zero – facts that violate the normality assumption of OLS regressions.[3]

[3] See Coxe, Stefany, Stephen West, and Leona Aiken. "The Analysis of Count Data: A Gentle Introduction to Poisson Regression and Its Alternatives." *Journal of Personality Assessment*, 91(2), 121-136, 2009.
The probability mass function for the Poisson distribution is:

$$P(Y = y|\mu) = \frac{\mu^y}{y!}e^{-\mu}$$

Figure 3: Distribution of days absent among students in sample population



Days Absent (min: 0, max: 171, mean: 7.9, median: 5, std. dev: 9.1)

In particular, I estimate models that build off the following form:

$$(1)\ \log(Y_{i,g,s,t}) = \beta_0 + \beta_1 SHC_{i,g,s,t} + \beta_2 Trans_{i,g,s,t} + \beta_3 Y_{i,g,s,t-1} + \beta_4 X_{i,g,s,t} + \beta_5 SCL_{s,t} + \delta_i + \epsilon_{i,g,s,t}$$

where $Y_{i,g,s,t}$ is the predicted count on the number of days absent for student *i* in grade g in school s in year t, $Trans$ is an indicator variable that equals one in the year a student transitions to a new school, $Y_{i,g,s,t-1}$ is the number of days each student missed in the previous year, X is set of individual student characteristics in year t (including gender, ethnicity, eligibility for free or reduced price lunch), SCL is a set of school characteristics in year t (including locale of the school, percent of the student body living in poverty, and number of crimes per 100 students enrolled), and δ_i is a set of student fixed effects that control for any student-level unobserved differences that do not vary across the study period. The coefficient of interest in the above equation is β_1, which depends on whether a student is enrolled in a SHC in year t. Throughout the analysis that follows, SHC is measured in two different ways: as the presence of any SHC and as the presence of a SBHC.

In both cases, the variable of interest is an indicator variable with one equal to the presence of the treatment.

While the above model controls for the effect of structural transitions on student absenteeism, it does not account for three key interactions that contribute to the overall effect of SHCs: the interaction between student enrollment in a school with a SHC in year *t*, student enrollment in a school with a SHC in year *t-1*, and student transition to a new school in year *t*. By including a triple interaction in the regression model, it becomes possible to draw the following helpful distinctions.

Description of Interaction Variables

Interaction Variables	**Description**
SHC	Indicator: Equals one if student enrolled in school with SHC in year t
SHC_lag	Indicator: Equals one if student enrolled in school with SHC in year t-1
School_transition	Indicator: Equals one if student transitions to new school in year t

Description of Interaction Terms

Interaction	**Description**
SHC * SHC_lag * School_transition	Transitions between schools, both with SHCs
SHC * School_transition	Transitions from school without SHC to school with SHC^
SHC_lag * School_transition	Transitions from school with SHC to school without SHC^
School_transition	Transitions between schools, both lack SHCs
SHC * SHC_lag	Remains in same school, SHC in both years
SHC	Remains in same school, SHC introduced in second year
SHC_lag	Remains in same school, SHC removed in second year
Base	Remains in same school with no SHC

^ Denotes the two key interactions of interest. The other variables serve as controls.

Figure 4: Interaction Example

		Student transitions to new school in year *t*	
		No (Trans = 0)	Yes (Trans = 1)
Student enrolled in school w/ no SHC in year *t-1*	No SHC in year *t* *(=0)*	Stays in same school w/ no SHC	Moves to new school but no SHC
	SHC in year *t* *(=1)*	Stays in same school, but SHC opens	Moves from school w/o SHC to school w/SHC

In order to estimate the effect of transitioning from a school without a SHC to a school with a SHC, I use the following specification:

$$(2)\ \log(Y_{i,g,s,t}) = \beta_0 + \beta_1 SHC_{i,g,s,t} * Trans_{i,g,s,t} * SHC_{i,g,s,t-1} + \beta_2 SHC_{i,g,s,t} * Trans_{i,g,s,t} + \beta_3 Trans_{i,g,s,t} * SHC_{i,g,s,t-1} + \beta_4 SHC_{i,g,s,t} * SHC_{i,g,s,t-1} + \beta_5 SHC_{i,g,s,t} + \beta_6 Trans_{i,g,s,t} + \beta_7 SHC_{i,g,s,t-1} + \beta_8 X_{i,g,s,t} + \beta_9 SCL_{s,t} + \delta_i + \epsilon_{i,g,s,t}$$

where β_1 is the coefficient for the triple interaction term that shows the effect of student *i* moving from a school in year *t-1* that had a SHC to a school in year *t* that also had a SHC; β_2 and β_3 are the coefficients of interest that estimate the change in the number of the days a student misses per year associated with gaining more robust health services via entering or leaving a school with a SHC; and β_4 - β_7 controls for the remaining combinations from the interaction described above. All other parts of the Poisson regression equation are the same as in equation (1) above.

Additionally, in recognition that the effect of SHCs on student absenteeism may vary in important ways among some subgroup of students with higher needs, the following analysis restricts the sample in some models to include two subsets of students traditionally considered at greater risk of poor education outcomes: students eligible for free and reduced price lunch (FRL), and students who experience at least one year during the study in which they are absent 20 days or more. Examining the effects of SHCs on student absenteeism for these two subgroups is key to gaining a fuller picture of distributional impacts of the intervention.

A final potential methodological issue is the presence of measurement error. Aggregation to the school level could produce measurement error from the fact that some students in schools with SHCs were not enrolled in or do not use the SHC. The percent of the student population enrolled in SHCs in 2010, for example, ranged from under 60 percent to over 90 percent, with a mean enrollment rate of 75 percent. The fact that some students remain "untreated" though enrolled in a treatment school works to the benefit of this analysis, because it means that any positive benefit associated with enrollment in a school with a SHC is likely underestimated.

Results

Table 8 presents the estimates from equation (1) using different treatment measures. Across all treatment variables and all cohorts (see Appendix 7), the table consistently shows that enrollment in school with a SHC is associated with an increase in student absenteeism. Poisson regression coefficients cannot be interpreted as simply as in OLS regressions since the output is similar to a logistic regression. The clearest way to interpret these coefficients, or rate ratios, is to convert them to percent change using the following formula:

$$(e^{b} - 1) * 100\%$$

Thus according to model one, enrollment in a SHC increases the number of days students miss, on average, by 13.9 percent.

$$(e^{.130} - 1) * 100\%$$

Some models include a squared form of the percent of the student body living in poverty because the relationship between days absent and this variable is not linear, as illustrated in Figure 5 below. Up to a point, the relationship between days absent and the concentration of poverty within a school fits our expectations, with absenteeism increasing as poverty becomes more concentrated within the student population. However, at higher levels of concentrated poverty, the trend reverses. One possible explanation for this reduction is that schools with the highest concentrations of poverty are more likely to receive additional interventions or student support services.

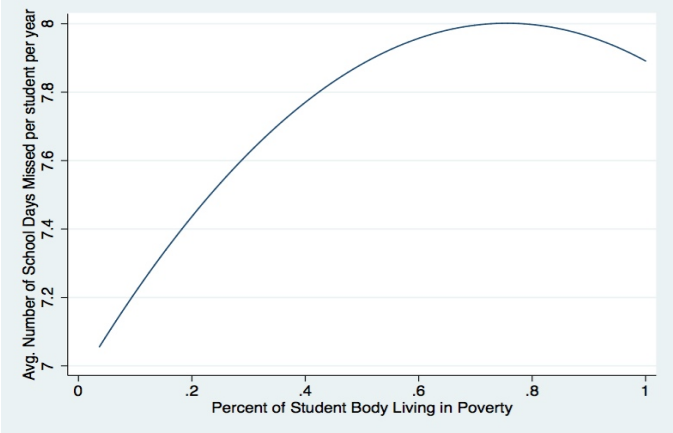
Table 8: The Effect of SHCs on Student Absenteeism, Equation (1)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel A: Cohort 1				
Enrolled in school w/ SHC	0.130***	0.125***	0.135***	0.134***
	(0.00284)	(0.00286)	(0.00863)	(0.00849)
School Transition	0.0355***	0.0109***	0.0346***	0.0107**
	(0.00190)	(0.00196)	(0.00439)	(0.00470)
Female		-0.0695***		
		(0.00825)		
White		-0.0243***		
		(0.00793)		
Eligible for FRL		0.112***		
		(0.00328)		

LEP		0.0530***		
		(0.0130)		
School in rural locale		0.0134***		
		(0.00304)		
Number of crimes per 100 enrolled students		0.0373***		
		(0.000611)		
Percent of student body in poverty				0.547***
				(0.0766)
Squared form: Percent of student body in poverty				-0.874***
				(0.0699)
Constant	2.138***	2.069***		
	(0.004)	(0.007)		
Student fixed effects	No	No	Yes	Yes
Observations	178,800	174,833	173,719	173,591
Number of unique students	37,585	37,540	35,105	35,104

*** p<0.01, ** p<0.05, * p<0.1

Figure 5: Relationship between days absent and school poverty percentage



The results for equation (1), which show SHCs are associated with an increase in the number of days students are absent, likely reflect the non-random assignment of SHCs to schools with higher concentrations of students at-risk for poor educational outcomes, including increased absenteeism, than students in the counter factual group. The results for equation (1) continue to reflect a positive association between enrollment in a SHC and days absent, even when we restrict the sample to student subgroups more likely to benefit from SHCs (students eligible for FRL or chronically absent students). The model also fails to take full advantage of the study design's use of school transitions to estimate the effect on days absent of moving from a school without a SHC in year *t-1* to a school with a SHC in year *t*.

Table 9 presents the estimates from equation (2). The inclusion of interaction terms enables us to see how entering or leaving schools with more robust health services changes rates of student absenteeism, as well as whether the benefits grow with consecutive years of "treatment." The results from equation (2) tell a very different story from equation (1). While results vary some across cohorts (see Appendix 8 - 10), overall the results suggest that: 1) students miss fewer days of school, on average, when they transition into a school with more robust health services, and 2) miss more days of school when they leave a school with a SHC and enter a school with less robust health services. Specifically, according to model *2* below, students who move from a school without a SHC to a school with a SHC miss, on average, 8.2 percent fewer days of school. By contrast, students who move to schools with less robust health services miss, on average, 13.2 percent more days of school.

Table 9: The Effect of SHCs on Student Absenteeism, Equation (2)

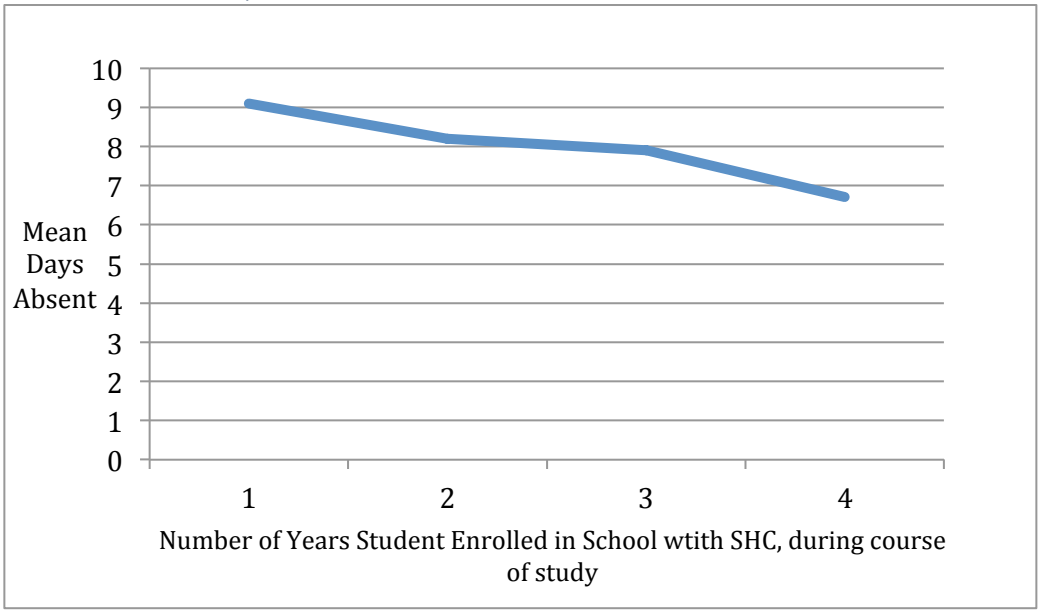
VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel A: Cohort 1				
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0990***	-0.0861***	-0.0979***	-0.0686***
	(0.0166)	(0.0170)	(0.0167)	(0.0168)
Transitions from school with SHC to school without SHC	0.134***	0.124***	0.140***	0.124***
	(0.00672)	(0.00676)	(0.00682)	(0.00685)
Transitions between schools, both with SHCs	-0.0500***	-0.0559***	-0.0474**	-0.0729***
	(0.0190)	(0.0193)	(0.0191)	(0.0192)
Transitions between schools, both lack SHCs	-0.0412***	-0.0569***	-0.0460***	-0.0627***
	(0.00225)	(0.00230)	(0.00227)	(0.00232)
Remains in same school, SHC in both years	-0.0902***	-0.0824***	-0.0835***	-0.0560***
	(0.0163)	(0.0166)	(0.0164)	(0.0164)
Remains in same school, SHC introduced in second year	0.235***	0.219***	0.242***	0.210***
	(0.0161)	(0.0164)	(0.0162)	(0.0162)
Constant	2.188***	2.122***		
	(0.00444)	(0.00806)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	155,839	154,073	151,620	151,490
Number of unique students	39,671	39,644	36,077	36,075

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Estimates in table 9 also suggest that the initial introduction of SHCs into schools is associated with a large increase in rates of absenteeism for students already enrolled in the school. However, this may be largely driven by the non-random assignment of SHCs to schools. In addition to non-random assignment, at least two other possible explanations seem plausible: (1) during the period of this study, the introduction of less comprehensive, non-school-based forms of SHC became more common. For example, telemedicine was introduced in 47 percent of the schools that gained SHCs during this period. It may be that these less comprehensive models are less effective than SBHCs at reducing student absenteeism. (2) Over 70 percent of the schools benefiting from the introduction of SHCs during this study, received the SHCs late in the study period (during the last 1 to 2 years). It may be that SHCs need to be in place for longer periods than 1 to 2 years before we can see an effect on student absenteeism. By contrast, many of the SBHCs were introduced well before the start of this study, supporting the hypothesis that that SHCs become more effective, on average, the more years they have been in operation. (3) Finally, the difference may reflect less the relative inexperience, in terms of years of service, of the SHC introduced during the course of the study, and more that students in this group, on average, were enrolled fewer years in the schools that provided the service due to the introduction of the SHCs late in the study. There is some evidence to suggest that students experience better outcomes the longer they are enrolled in schools with SHCs, though this bears more rigorous analysis. Figure 6 below, which provides a descriptive look at the relationship between the number of years a student is enrolled in SHCs and the number of days students miss per year, suggests that as years of enrollment increases, the average number of days student's miss decrease. Again, further research is needed to confirm which, if any, of the above mechanisms are at play.

Figure 6: Mean Number of Days Absent per year by Number of Years Enrolled in School with SHC, 2006 - 2012



For students traditionally more at-risk for poor educational outcomes, SHCs prove even more effective. Models 5 – 8 restrict the sample to student subgroups (students eligible for free and reduced price lunch, and students who missed more than 20 days of school in a year, respectively) that research suggests may benefit more from enrollment in SHCs. Restricting the sample to these groups may also create a more appropriate counterfactual group of students. Both subgroups appear to benefit more, on average, from enrollment in SHCs than the full sample of students in their cohort. Specifically, according to the more conservative estimates below, students eligible for FRL who move from a school without a SHC to a school with a SHC missed, on average, 10.5 percent fewer days of school, while chronically absent students missed, on average, 11 percent fewer days. By contrast, students eligible for FRL and students with a history of chronic absenteeism who move to schools with less robust health services miss, on average, 16.1 and 11.9 percent more days of school, respectively.

Table 10: The Distributional Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) Daysabs	(8) daysabs
Panel A: Cohort 1	FRL only	FRL only	>20 dayabs	>20 dayabs
Remains in same school with no SHC	Base	Base	Base	Base

Transitions from school without SHC to school with SHC	-0.111***	-0.138***	-0.116***	-0.146***
	(0.0227)	(0.0222)	(0.0388)	(0.0418)
Transitions from school with SHC to school without SHC	0.149***	0.174***	0.112***	0.172***
	(0.00819)	(0.00829)	(0.0118)	(0.0134)
Transitions between schools, both with SHCs	-0.0552**	-0.0458*	-0.0865**	-0.124***
	(0.0255)	(0.0251)	(0.0428)	(0.0466)
Transitions between schools, both lack SHCs	-0.0465***	-0.0334***	-0.00445	-0.00607
	(0.00315)	(0.00312)	(0.00458)	(0.00491)
Remains in same school, SHC in both years	-0.111***	-0.124***	-0.0632*	-0.0584
	(0.0223)	(0.0218)	(0.0383)	(0.0413)
Remains in same school, SHC introduced in second year	0.267***	0.305***	0.190***	0.261***
	(0.0220)	(0.0214)	(0.0378)	(0.0405)
Constant	2.288***		3.392***	
	(0.00932)		(0.00875)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	75,833	71,803	13,756	9,174
Number of unique students	23,320	18,769	8,225	3,556

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Findings also provide some evidence, albeit mixed, that more comprehensive SHC models, while no more effective at reducing student absenteeism for the general student population, may be even more effective at reducing rates of student absenteeism among higher-risk student populations. Table 11 and 11b restrict the sample of students enrolled in "treatment" schools to those schools with SBHCs and the overall sample to those counties with at least one SBHC. Previous models so far treated all SHC models as a uniform treatment. The below models suggests that the kind of SHC model used matters for subgroups of students traditionally considered at greater risk for poor outcomes. While the effect size for the general population of students enrolled in SBHCs is comparable to SHCs (compare Table 11 with Table 9 above), students eligible for FRL and students with a history of chronic absenteeism experience larger reductions in rates of absenteeism when enrolled in schools with SBHCs.

Table 11: The Effect of SBHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel A: Cohort 1				
Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SBHC to school with SBHC	-0.103***	-0.0819***	-0.0957***	-0.0737***
	(0.0193)	(0.0198)	(0.0194)	(0.0194)
Transitions from school with SBHC to school without SBHC	0.107***	0.101***	0.113***	0.111***
	(0.00772)	(0.00777)	(0.00785)	(0.00787)
Transitions between schools, both with SBHCs	-0.0333	-0.0482**	-0.0377*	-0.0654***
	(0.0220)	(0.0225)	(0.0222)	(0.0223)
Transitions between schools, both lack SBHCs	-0.0351***	-0.0518***	-0.0406***	-0.0585***
	(0.00236)	(0.00242)	(0.00238)	(0.00244)
Remains in same school, SBHC in both years	-0.0990***	-0.0869***	-0.0870***	-0.0659***
	(0.0189)	(0.0194)	(0.0190)	(0.0191)
Remains in same school, SBHC introduced in second year	0.259***	0.242***	0.261***	0.237***
	(0.0185)	(0.0190)	(0.0186)	(0.0186)
Constant	2.172***	2.103***		
	(0.00724)	(0.00835)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	139,392	137,743	132,711	132,584
Number of unique students	38,243	38,188	32,106	32,103

*** p<0.01, ** p<0.05, * p<0.1

Specifically, as summarized in Table *11b* below, students eligible for FRL who move from a school without a SBHC to a school with a SHC missed, on average, 13.4 percent fewer days of school compared to 10.5 percent fewer days of school when enrolled in schools that included other non-school-based SHC models. Similarly, chronically absent students missed, on average, 18.1 percent fewer days when enrolled in schools with SBHCs compared to 11 percent fewer days when enrolled in schools with SHCs that included school-linked, mobile, or telemedicine units.

Table 11b: Distributional Effect of SBHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel A: Cohort 1	FRL only	FRL only	>20 daysabs	>20 daysabs

Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SBHC to school with SBHC	-0.144***	-0.110***	-0.202***	-0.182***
	(0.0249)	(0.0256)	(0.0447)	(0.0420)
Transitions from school with SBHC to school without SBHC	0.144***	0.123***	0.156***	0.0971***
	(0.00952)	(0.00941)	(0.0157)	(0.0138)
Transitions between schools, both with SBHCs	-0.0201	-0.0358	-0.0703	-0.0114
	(0.0284)	(0.0289)	(0.0512)	(0.0472)
Transitions between schools, both lack SBHCs	-0.0281***	-0.0407***	-0.00341	-0.00403
	(0.00325)	(0.00328)	(0.00519)	(0.00483)
Remains in same school, SBHC in both years	-0.122***	-0.103***	-0.0923**	-0.110***
	(0.0244)	(0.0251)	(0.0442)	(0.0413)
Remains in same school, SBHC introduced in second year	0.312***	0.276***	0.300***	0.244***
	(0.0238)	(0.0246)	(0.0429)	(0.0407)
Constant	2.274***		3.420***	
	(0.00966)		(0.0201)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	63,158	68,168	7,675	11,998
Number of unique students	16,766	22,270	2,997	7,376

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Robustness Checks

To check the robustness of these findings, I ran the exact same analysis above but coded the data so that students entered SHCs either via school transition or introduction of SHCs one year later than actually occurred. If the size of the coefficient increased, then I would have reason to suspect something else may be driving the observed change in student absenteeism. Table 12 reports the estimates for this model for cohort 1. When the treatment variables are lagged forward one year, the size of the coefficients decreases significantly but continue to tell a similar story. These finding support the previous analysis. We would expect to find a smaller reduction in student absenteeism if (a) some students had actually gained benefits in the previous year when they first transitioned into SHCs, and were still experiencing benefits by remaining in the SHC an additional year, and/or (b) some students were actually enrolled in schools with SHCs in the previous year but transitioned out of these schools in the year now coded as the first year of "treatment." Both of these scenarios are likely occurring, and the combination would likely explain a percent reduction in the effect size.

Table 12: The Effect of SHCs on Student Absenteeism, with Forward Lag (t+1), Equation (2)

VARIABLES	(1) daysabs	(3) daysabs
Panel A: Cohort 1		
F.Remains in same school with no SHC	Base	Base
F.Transitions from school without SHC to school with SHC	-0.0596***	-0.0574***
	(0.0177)	(0.0178)
F.Transitions from school with SHC to school without SHC	0.0945***	0.0999***
	(0.00698)	(0.00711)
F.Transitions between schools, both with SHCs	-0.0358*	-0.0332
	(0.0201)	(0.0202)
F.Transitions between schools, both lack SHCs	0.0712***	0.0667***
	(0.00234)	(0.00236)
F.Remains in same school, SHC in both years	-0.0241	-0.0157
	(0.0174)	(0.0175)
F.Remains in same school, SHC introduced in second year	0.148***	0.154***
	(0.0171)	(0.0172)
Constant	2.025***	
	(0.00419)	
Student fixed effects	No	Yes
Observations	155,841	151,620
Number of unique students	39,671	36,076

*** p<0.01, ** p<0.05, * p<0.1

Discussion and Policy Implications

These findings support previous studies that have found SHCs reduce student absenteeism and ensure students are present and ready to learn. Additionally, the findings (1) provide evidence that SHCs may be especially effective at addressing needs of students traditionally considered at greater risk for poor educational outcomes, and (2) that these students experience even greater reductions in absenteeism when enrolled in schools with school-based health centers. This paper presents the first statewide quasi-experimental evaluation of SHCs in North Carolina. The findings are promising, but additional research is necessary.

The results in this paper report only the Intent to Treat estimate (ITT). An ITT estimate is policy relevant, as it provides an estimate of the treatment effect based on the presence of non-compliers or people who do not, for various reasons, utilize available services. However, it is important to note that the Treatment on the Treated (TOT) estimate, which distinguishes users from non-users, would likely find an even larger

reduction in absenteeism for students who use SHC services. Two factors point to the possibility that the ITT estimate may be smaller than the TOT estimate. First, the need for parental consent may mean that some of the students most in need of school-based health care are unable to access it. In the absence of records that identify which students actually enroll in and utilize SHC services, there is no way to check if lack of parental consent is correlated with household income or higher rates of student absenteeism. Second, the school-wide effect of introducing a SHC is likely much smaller than the effect for those students who actually utilize services. Additionally, while poor health plays an important role in student absenteeism, other factors also contribute to these outcomes that likely are unaffected by a SHC, including housing instability and the need for a student to work. The inability to identify health related absences might result in underestimating the ITT estimate.

Understanding the role of SHCs in improving the academic performance of students is critical in the ongoing debate around what strategies and policies will be most effective at closing the persistent achievement gap. Many strategies currently employed by those working to reform education focus on classroom instruction and how teachers and principals can better support student learning. SHCs, on the other hand, represent, to borrow from Professor Helen Ladd's address on *Education and Poverty*, "a broader and bolder approach to education policy than the recent efforts to reform schools" [4] – one that implicitly argues that closing the achievement gap will require more than effective teachers and school leaders alone.

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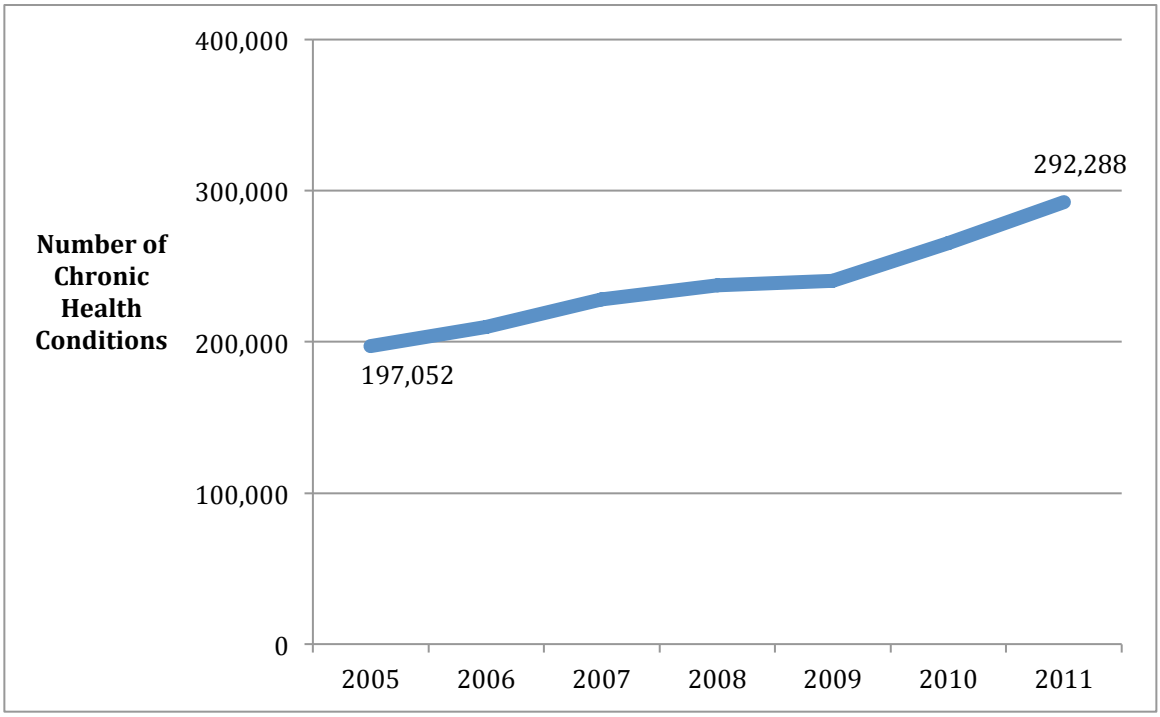
Appendix 1: Number of identified individual chronic health conditions among NC children, 2005 - 2011



Source: Annual School Health Services Reports, NC DHHS

Appendix 2: History of SBHCs as a public policy intervention

SBHCs have been in operation in the United States for over 40 years. They grew out of an earlier public health movement, beginning in the 1900s, to address excessive student absenteeism from contagious diseases by placing nurses in schools. The first SBHC, located in an elementary school in Massachusetts**,** was established in recognition that community based health centers were key to addressing problems of accessibility for low-income populations. Offering health services in the location where children spend most of their time between the ages of 6 and 18 – on school grounds – provides a practical solution to concerns over accessibility by minimizing barriers for low-income families caused by transportation, scheduling, and provider shortages (Gustafason 2005, Keeton 2012).

A growing concern over the health and wellness of U.S. adolescents led to an increase in the number of SBHCs located in high schools and middle schools across the nation(Keeton, Soleimanpour, and Brindis 2012). Today there are approximately 1,930 SBHCs operating in 48 states and territories, 33 percent of which are located in high schools, and 54 percent of which are in urban communities – a trend bucked by NC. Three-quarters of the nation's SBHCs have been in operation for at least five years (School Based Health Alliance 2011). Despite the growth in SBHCs, only a tiny fraction of public schools provide comprehensive on-site health services.

The first North Carolina SBHC was established in 1983 in a high school in Greene County(North and Parker 2010). In 1992, the General Assembly began appropriating funds for school-based (services offered on-site) and school-linked health centers (affiliated with outside health centers like county health departments or private pediatric practices) (Perdue et al. 2010). Currently, over 80 schools benefit from school health centers, most of them school-based. These schools are located in 28 counties, the majority of which are rural. 40 percent of the state's school health centers are located in high schools. All SBHCs target populations considered vulnerable to poor health outcomes due to high concentrations of poverty, relatively large numbers of uninsured children and inaccessibility to medical care (North and Parker 2010).

General Characteristics of SBHCs. In general, SBHCs share a couple of things in common: they are located on school grounds and offer a range of primary care and

preventative services led by a team of practitioners that often includes mid-level providers. Some SBHCs are more comprehensive than others in terms of the services they provide. According to the most recent national census of SBHCs, services range from comprehensive well-child and adolescent exams, immunizations, diagnosis and treatment of injuries or illness, management of chronic health conditions, mental health assessment and treatment, nutrition education, oral health, and reproductive health. (School Based Health Alliance 2011). These services are provided regardless of students' ability to pay.

While primary care is the most common type of health service provided, there is a growing trend toward the inclusion of mental health services. According to the most recent national census of SBHCs, over half of the centers now include at least one mental health professional. Of the 1,930 SBHCs in the United States in operation in 2010, nearly 70 percent include a mental health professional on staff. More than two-thirds of centers provided crisis intervention, comprehensive individual evaluation and treatment, case management, and classroom behavior and learning support. Additionally, 39 percent prescribed behavioral health medications (School Based Health Alliance 2011).

SBHC's have three main staffing models. 29 percent of SBHC's nationally use a primary care model that employs a nurse practitioner (NP) or physician assistant (PA), who provide basic health services and are supervised by a physician. 33 percent use a more comprehensive model that incorporates a mental health component via a licensed clinical social worker or school psychologist. Additionally, 37 percent employ additional professionals, such as nutritionists and health educators(School Based Health Alliance 2011). Finally, some NC SBHCs use alternative staffing models, more limited in terms of the scope of professionals employed, which focus only on certain areas of acute need, such as nutritional counseling and mental health (North and Parker 2010).

Three Primary Staffing Models Employed by SBHCs

Staffing Models	Primary Care Model	Primary Care/Mental Health Model	Primary Care/Mental Health Plus Model
Clinical	NP or PA	NP or PA	NP or PA
Support/Education	RN or LPN	RN or LPN	RN or LPN
Mental Health		LCSW or Psychologist	LCSW or Psychologist
Other			Social Worker/ nutritionist/ dental care

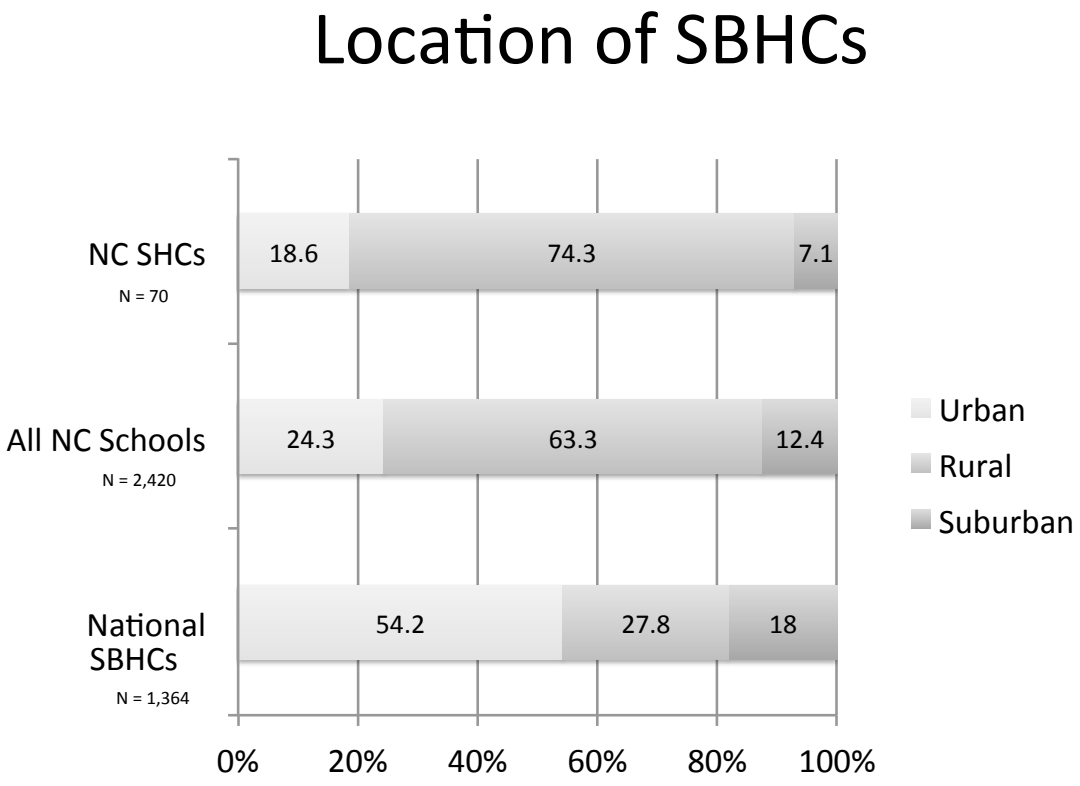
Abbreviations: Nurse Practitioner (NP), Physicians Assistant (PA), Registered Nurse (RN), Licensed Practical Nurse (LPN), Licensed Clinical Social Worker (LCSW).

Studies have credited SBHCs with numerous beneficial outcomes for children, including increased utilization of primary care in lieu of the emergency room (Young et. Al. 2001); increased utilization of health care by adolescents for reasons pertaining to sexual health, substance abuse, or mental health due to ease of access to a confidential setting (Coyne-Beasley 2003, Ethier 2011); increased likelihood of receiving recommended vaccines, immunizations and screenings, including screening for risky behaviors (Kisker 1996); improved student management of chronic health conditions (Guo 2005); decreases in absenteeism, early dismissals, discipline issues, and school dropouts (Barnett 2004, Kearns 2011); increases in graduation rates (McCord 1993); and a decline in the rate of teen pregnancies (Ricketts 2006).

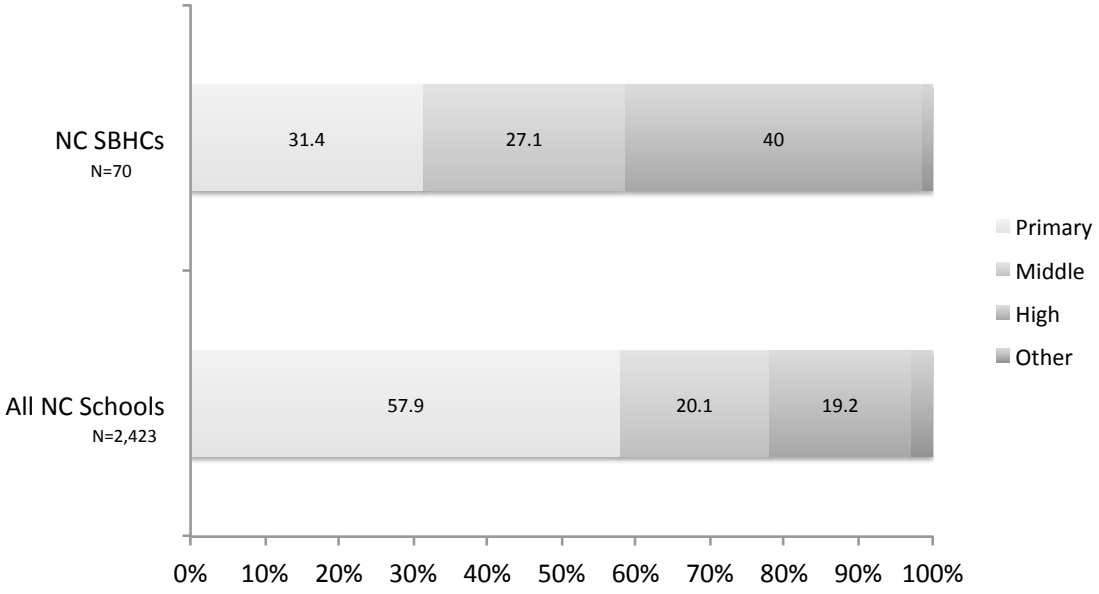
Appendix 3: Descriptive Summary of North Carolina School Health Centers

The following descriptive summary comes from the author's calculations of raw data from the 2010-2011 National Census of School Health Centers. The data is collected on a triennial basis by the School Based Health Alliance. Some of the descriptive summaries below draw from additional data reported by the National Center for Educational Statistics.

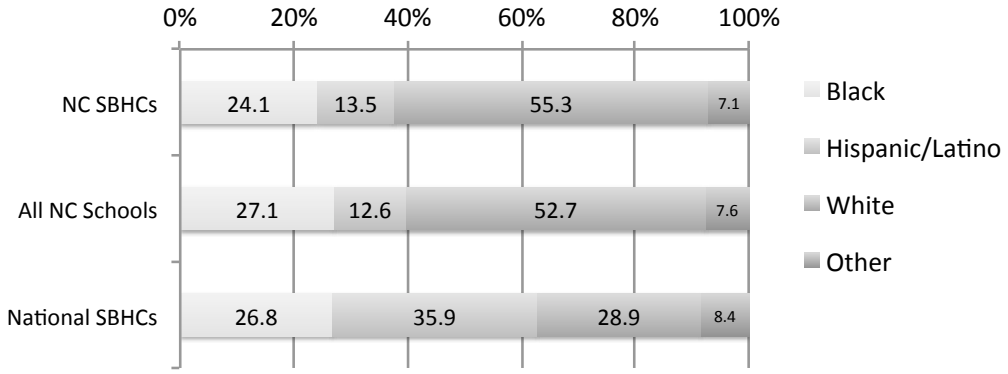
53 North Carolina SHCs responded to the 2010-11 census. Five of the centers are now closed, and additional centers have opened since the completion of the last census, many o of which are mobile units or practice telemedicine.

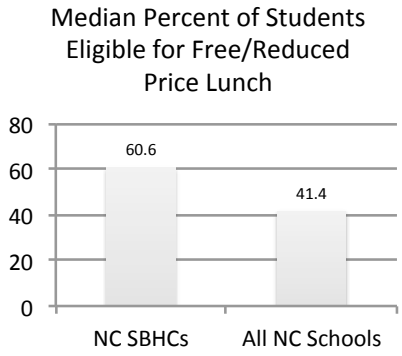


Comparison of School Type, NC SBHCs vs. all NC Public Schools

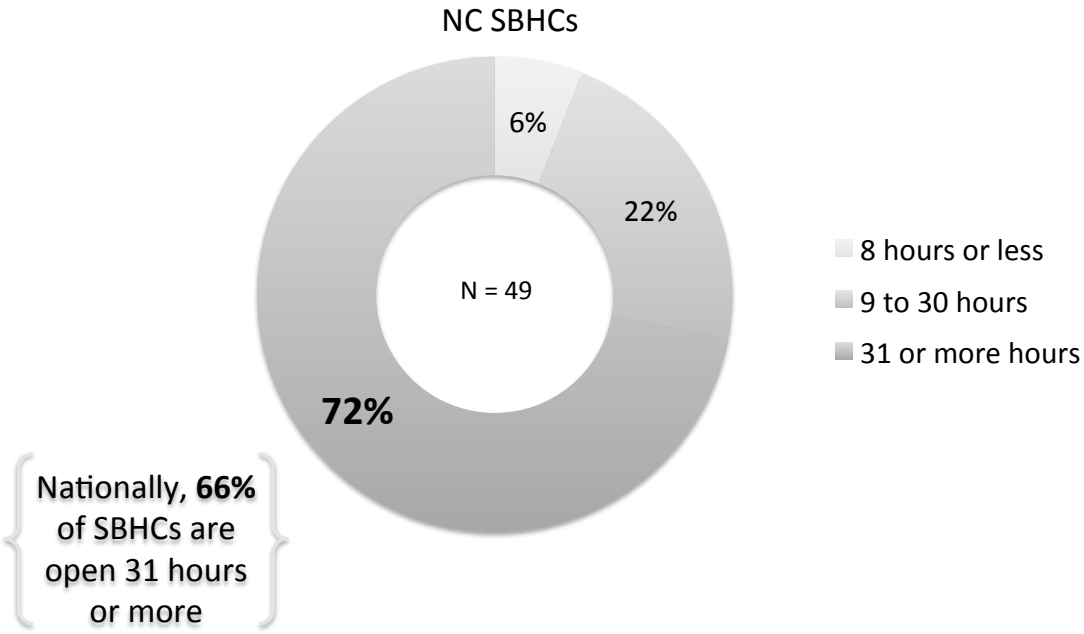


Demographics of School Served by SBHCs



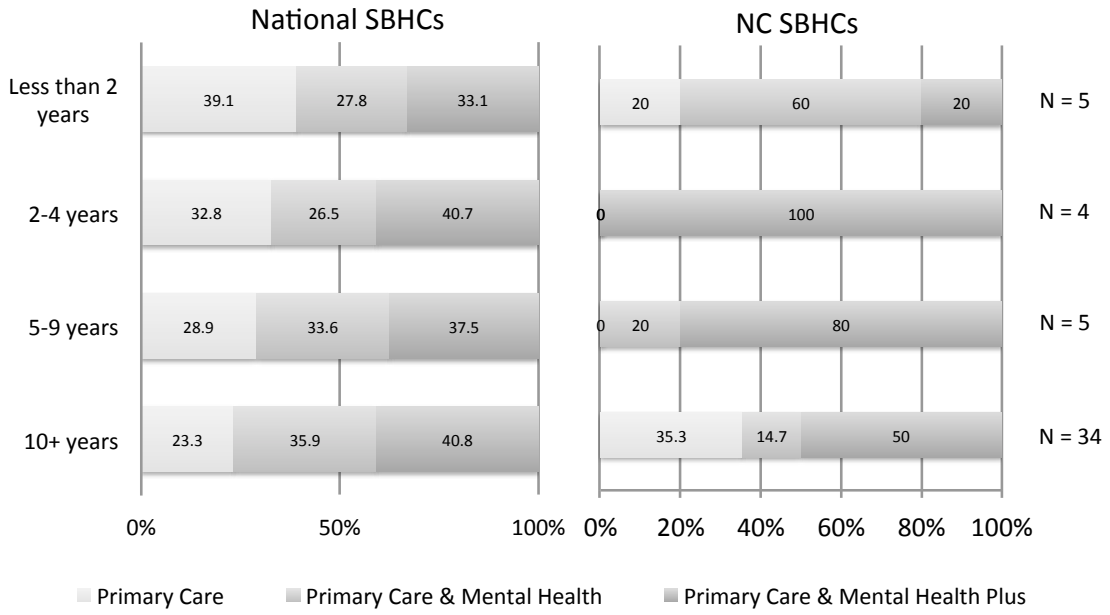


SBHC hours open per week

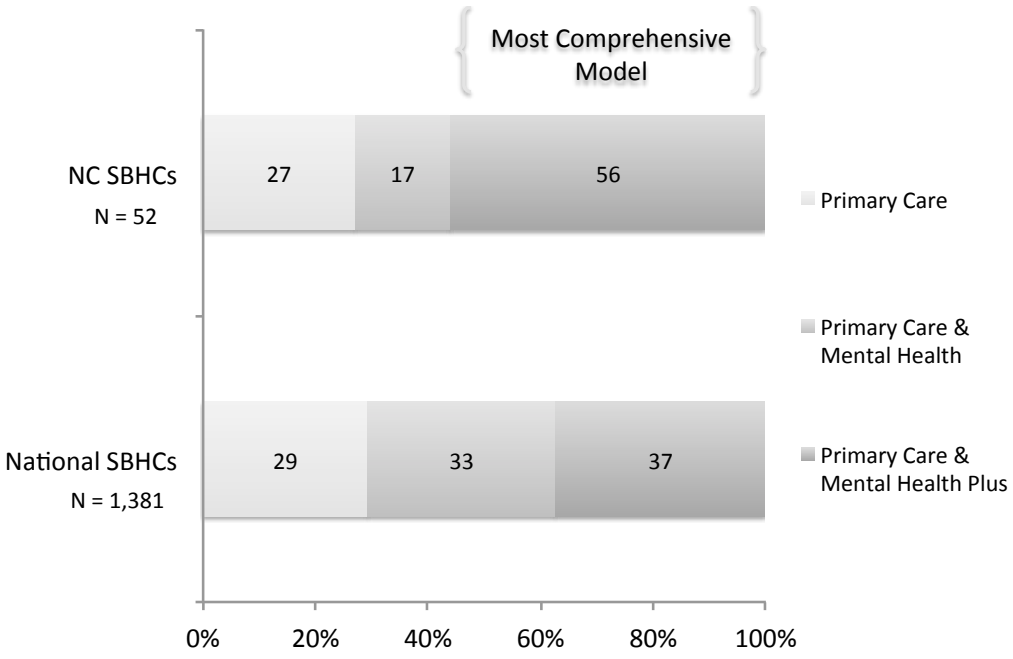


SBHC Provider Model by Number of Years Open

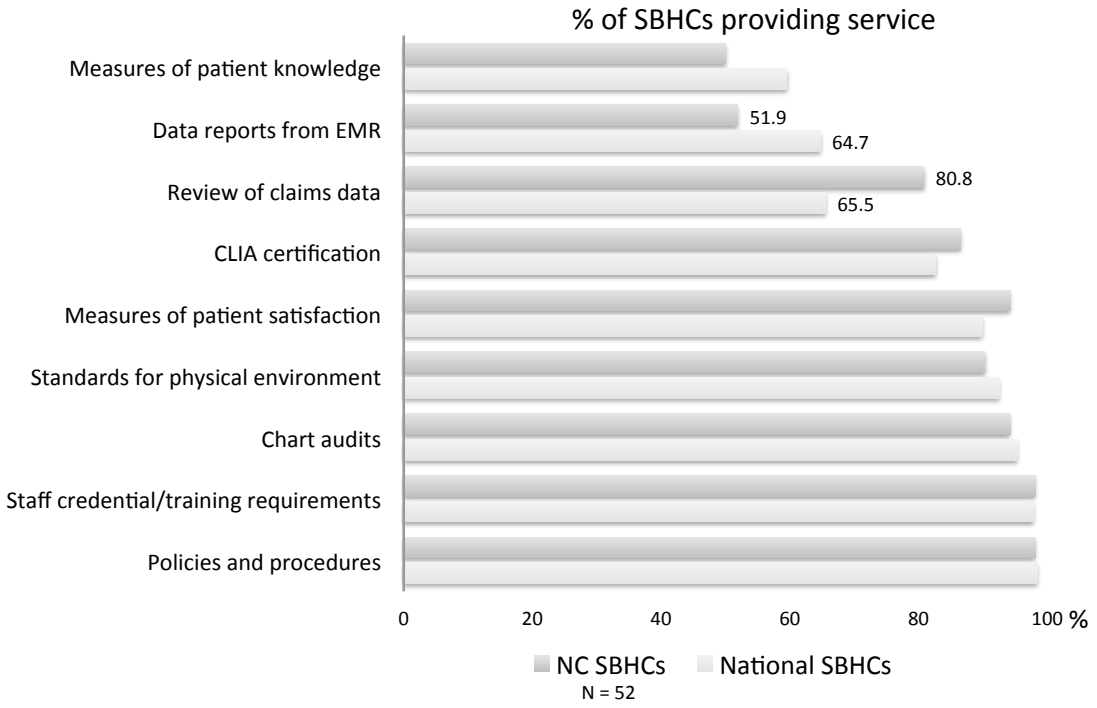
In the 2010 Census, 34 centers reported being open 10 or more years.



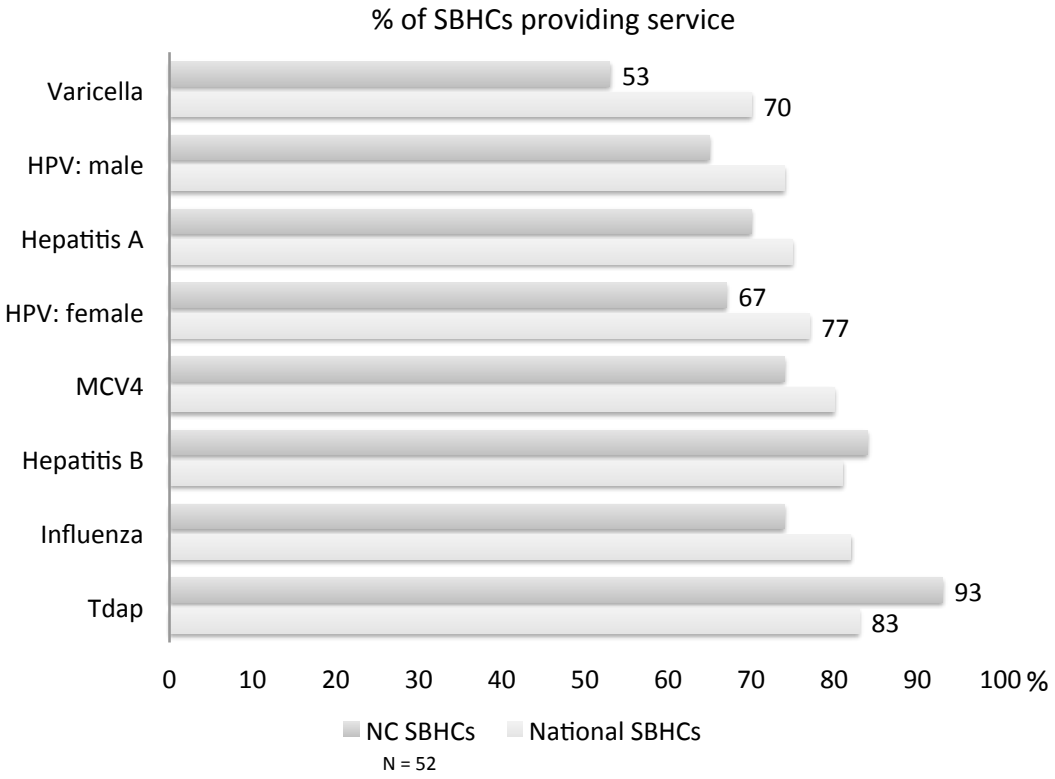
SBHC Provider Models



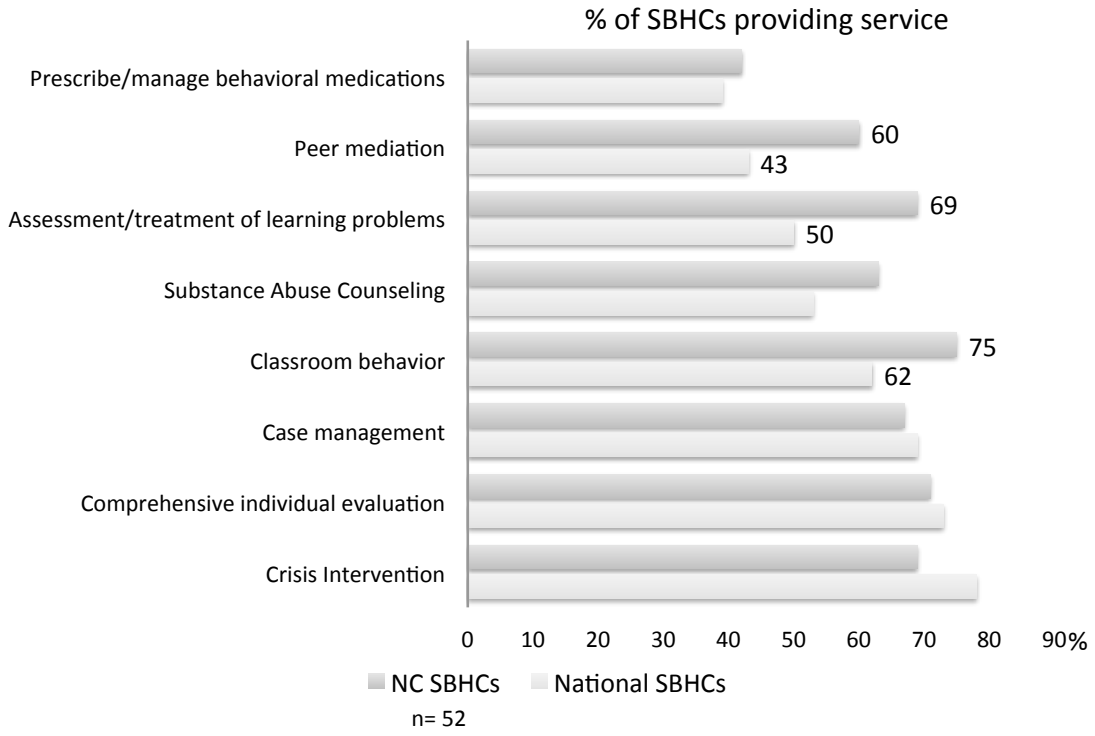
Components of Quality Assurance System Used by SBHCs



Adolescent Immunizations Provided by SBHCs

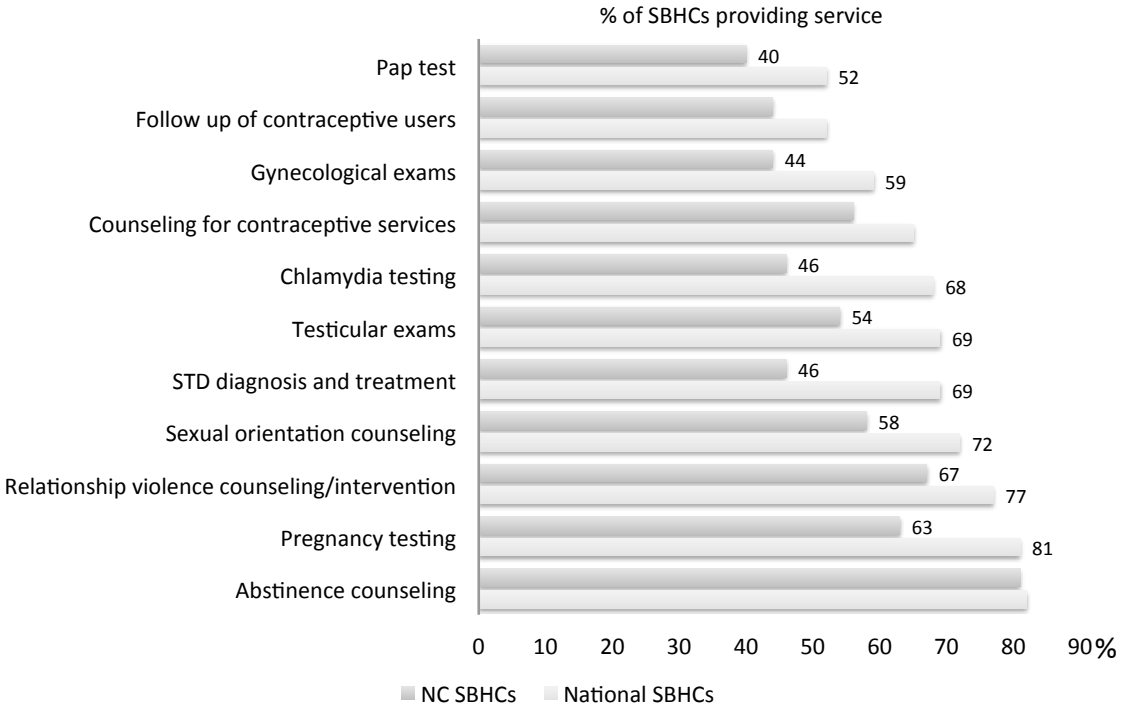


Mental Health Services provided by SBHCs by intervention level

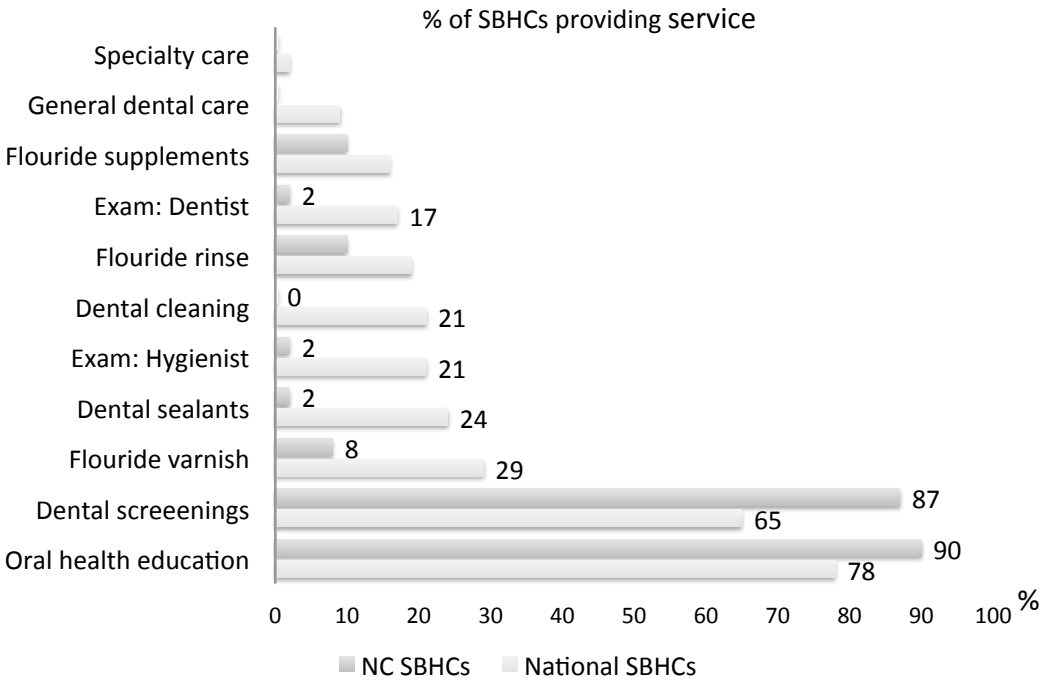


Adolescent Reproductive Health Services provided on-site by SBHCs

86% of SBHCs serving adolescents in NC are prohibited from dispensing contraceptives compared to **50%** of nationwide respondents.



Oral Health Services provided on-site by SBHCs



Injury and Violence Prevention Activities Provided, by level of intervention by SBHC

	National SBHCs			NC SBHCs		
Prevention Activity	Individual	Small Group	Classroom/ School	Individual	Small Group	Classroom/ School
Violence prevention	82%	34%	35%	79%	52%	52%
Sexual assault	76%	22%	20%	70%	33%	23%
Teen dating violence	76%	27%	23%	67%	30%	28%
School safety/ climate	76%	31%	30%	60%	46%	42%
		n = 1,300			n = 43	

LEGEND	
	NC is underperforming compared to the national average by at least 10%
	NC is over-performing compared to the national average by at least 10%

Healthy eating and active living promotion activities provided by SBHCs

	National SBHCs			NC SBHCs		
Activity	Individual	Small Group	Classroom/ School	Individual	Small Group	Classroom/ School
Healthy eating/ weight mgmt.	90%	44%	37%	96%	60%	46%
Chronic disease management	90%	27%	18%	88%	37%	17%
		n = 1,300			n = 52	

LEGEND	
	NC is underperforming compared to the national average by at least 10%
	NC is over-performing compared to the national average by at least 10%

Alcohol, Tobacco and Drug Use Prevention Activities by level of intervention by SBHC

	National SBHCs			NC SBHCs		
Prevention Activity	Individual	Small Group	Classroom/ School	Individual	Small Group	Classroom/ School
Alcohol use	78%	31%	34%	77%	42%	37%
Tobacco use	82%	31%	36%	94%	44%	38%
Drug Use	78%	30%	33%	75%	44%	37%
		n = 1,300			n = 52	

LEGEND	
	NC is underperforming compared to the national average by at least 10%
	NC is over-performing compared to the national average by at least 10%

List of Survey Respondents:

Apple Valley Middle School	Goldsboro High School	Shelby High School
Ashe County Middle School	Greene County High School	Shelby Middle School
Ashley Elementary	Harris Middle Schools	Southern High School
Bowman Middle School	Hillandale Elementary School	Southern Wayne High School
Brogden Middle School	Hiwassee Dam Elementary/Middle and High Schools; Ranger Elementary/Middle School	Teen Health Connection at Carolinas Health Care System
Bruce Drysdale Elementary School	Kings Mountain High School	Tipton Hill School & Family Health Center - ***CLOSED***
Buladean School & Family Health Center - ***CLOSED***	Kings Mountain Middle School	Wake Teen Medical Services School-Linked Center – ***CLOSED***
Burns High School	Madison Middle School	Wayne Middle/High Academy
Burns Middle School	McMichael High School	Weldon City Schools
Cane River Middle School	Micaville Elementary School	West Montgomery Middle School
Crest High School	Mineral Springs Middle & Elementary School	Wilkes County Health Department Mobile Expanded School Health
Crest Middle School	Morehead High School	Wilmington Health Access for Teens
Dillard Middle School	Mosley Performance Learning Center - ***CLOSED***	Winston-Salem Preparatory Academy
East Middle School	Mt. Olive Middle School	George Watts Elementary School
East Yancey Middle School	N. Forsyth High School - ***CLOSED***	Glenn Elementary School
EK Powe Elementary School	New Hanover High School	Robbinsville Middle and High School
Eugene Ashley High School	North Henderson High School	Rockingham High School
Gates County High School	Reidsville High School	

Appendix 4: Process for preparing dataset

I collected data for all students enrolled in NC Public Schools from 2006 to 2012 from NCERDC. I made the following decisions in preparing the data for longitudinal analysis:

1. Removing Duplicate Student IDs: Within in each year, many student IDs in the original source files I received from NCERDC were duplicates. My first step in removing duplicates was to keep student records only when the collection code equaled "first day of spring (FDS)." Data was collected for each student at several times throughout the school year, including after the first 20 days of enrollment, first day of fall, and first day of spring. I examined the data and concluded that FDS the most comprehensive data with respect to student attendance. Dropping observations from earlier collection periods removed most of the duplicate student records.

The remaining duplicate student records were for students who changed schools within one year. I removed these students, who represented approximately 0.02% of the sample in each year, from the dataset. Highly transient student populations, on average, likely miss more days of school. While it is unlikely, due to the small number affected relative to the overall sample size, that removal of these students from the dataset introduced bias into the estimates, any bias introduced would likely have made it harder to find an effect.

2. Missing data. Within each year, less than one percent of students were missing unique identifiers. These students were dropped from the dataset, as there was no way to follow them across years without the identifier. In addition, in 2008 and 2009 source data files, thousands of students, still a relatively small number in relation to the overall sample, were missing grade levels. To address this problem, I imputed grade levels from the student's date of birth, generating a grade based on which grade the student would have been in had the student (1) entered school based on the age eligibility rules established by the state, and (2) not been retained in any prior year.

3. Restricting sample size by LEA. I examined only students enrolled in schools located in LEAs that had at least one SHC in operation during the period 2006 to 2012. Students enrolled in schools located in other LEAs and students enrolled in charter schools

were dropped from the sample. For a complete list of LEAs included in this dataset, please reference Appendix 6.

4. Restricting sample size by grade level. The study follows eight cohorts of students as they transition between schools within counties that have at least one SHC. The study begins following students as they enter either 4th grade or 7th grade in 2006, 2007, 2008, or 2009, and follows each cohort for four years. The table below provides an illustration of the structure of cohorts in the dataset by grade level. To create this dataset, I removed students within each year who were not in the grade levels specified by the table below.

Structure of cohorts in dataset

Cohort	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
2006	Grade 4 Grade 7	Grade 5 Grade 8	Grade 6 Grade 9	Grade 7 Grade 10			
2007		Grade 4 Grade 7	Grade 5 Grade 8	Grade 6 Grade 9	Grade 7 Grade 10		
2008			Grade 4 Grade 7	Grade 5 Grade 8	Grade 6 Grade 9	Grade 7 Grade 10	
2009				Grade 4 Grade 7	Grade 5 Grade 8	Grade 6 Grade 9	Grade 7 Grade 10

Appendix 5: Location of SHCs in North Carolina

Study Sample Size, by unit and treatment type

Sample Unit	SBHC (Percent of Sample)		Any SHC (Percent of Sample)		Total
	N	%	N	%	N
Counties	20	77%	26	100%	26
Schools	52	7%	80	11%	701
High Schools	23	15%	34	22%	155
Middle Schools	20	13%	30	20%	152
Elementary Schools	9	2%	16	4%	394

Source: Author's calculations based on data from the NC School Report Card and information on the location of SBHCs provided by NCSCHA. Numbers based on 2010 data.

County SBHC Dosage Levels

	Number of Counties, by SBHC Dosage Level			
Dosage Level	Among All Schools	Among HS only	Among MS only	Among ES only
0%	6	14	14	21
1-10%	7	1	1	3
11-25%	11	4	3	2
25-50%	2	3	1	0
51%-75%	0	0	1	0
76-90%	0	2	0	0
91-99%	0	0	0	0
100%	0	2	6	0

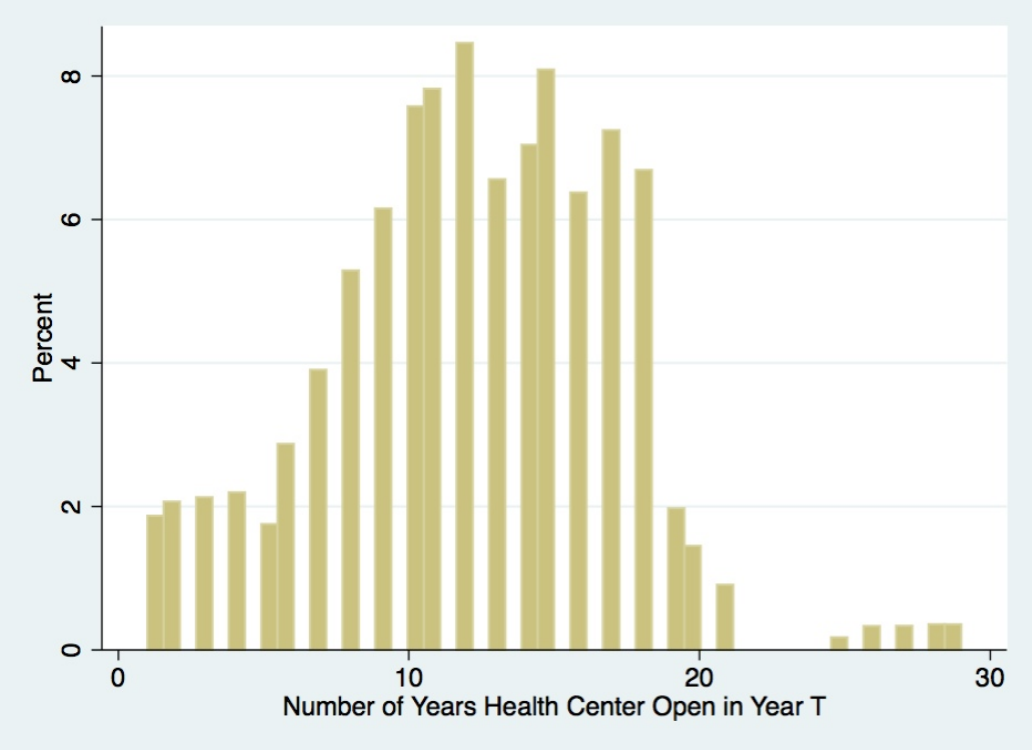
Source: Author's calculations based on data from the NC School Report Card and information on the location of SBHCs provided by NCSCHA. Numbers based on 2010 data.

Appendix 6: List of SHCs locations in NC during time of study, including year opened and closed

School Code	Year	Year Open	Year Closed
010326	2006	2013	
010392	2006	2013	
050305	2006	1999	
111302	2006	1995	2011
111356	2006	1995	2011
110340	2006	1995	2011
132304	2006	2012	
132330	2006	2012	
140308	2006	2012	
140344	2006	2012	
140360	2006	2012	
140376	2006	2012	
200308	2006	2012	
200314	2006	2000	
230312	2006	1999	
230316	2006	2000	
230324	2006	1992	
230328	2006	1997	
230350	2006	1991	
230352	2006	1994	
230361	2006	1991	
230362	2006	1994	
320363	2006	2004	
320347	2006	1996	
320320	2006	2001	
320325	2006	1995	
320368	2006	1997	
340308	2006	2001	
340448	2006	1999	
340452	2006	1999	
340568	2006	2001	
370312	2006	1995	
380308	2006	1997	
380310	2006	1997	
400308	2006	1983	
422314	2006	2011	
422324	2006	2011	
450301	2006	1994	
450306	2006	2009	
450336	2006	2010	
450341	2006	2008	

460318	2006	2013	
570319	2006	2009	
600 (linked)	2006		
610302	2006	2012	
610308	2006	1999	2012
610322	2006	2012	
610326	2006	2012	
610334	2006	2012	
610336	2006	1999	2012
620314	2006	1999	
620339	2006	2000	
650326	2006	2013	
650327	2006	2008	
650352	2006	2004	
650 (linked)	2006	1997	
650354	2006	2005	2012
710348	2006	2013	
78A000	2006	2000	
780344	2006	2000	
780384	2006	2000	
780420	2006	2000	
790314	2006	1994	
790354	2006	1994	
790366	2006	1994	
790378	2006	1994	
920 (linked)	2006	2005	2011
960312	2006	1997	
960326	2006	2000	
960335	2006	2004	
960337	2006	1997	
960348	2006	2002	
960380	2006	2006	
970315	2006	1994	
970320	2006	1994	
970356	2006	1994	
970388	2006	1994	
995308	2006	2011	
995316	2006	1993	
995320	2006	2011	
995324	2006	1993	
995328	2006	2011	
995330	2006	2012	
995336	2006	2012	

Number of years SHCs had been open in final year of study, 2012



Appendix 7: Effect of SHCs on Student Absenteeism, Cohorts 2-4, Equation (1)

Table 8: The Effect of SHCs on Student Absenteeism, Equation (1)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel B: Cohort 2				
Enrolled in school w/ SHC	0.0974***	0.0944***	0.104***	0.105***
	(0.00315)	(0.00317)	(0.00931)	(0.00921)
School Transition	-0.0249***	-0.0463***	-0.0254***	-0.0413***
	(0.00201)	(0.00208)	(0.00480)	(0.00503)
Female		-0.0480***		
		(0.00817)		
White		-0.00972		
		(0.00791)		
Eligible for FRL		0.122***		
		(0.00358)		
LEP		-0.0638***		
		(0.0127)		
School in rural locale		0.00584*		
		(0.00312)		
Number of crimes per 100 enrolled students		0.0315***		
		(0.000620)		
Percent of student body in poverty				0.710***
				(0.0840)
Squared form: Percent of student body in poverty				-0.849***
				(0.0725)
Constant	2.129***	2.052***		
	(0.00722)	(0.00784)		
Student fixed effects	No	No	Yes	Yes
Observations	164,451	162,061	161,210	160,840
Number of unique students	37,664	37,640	34,974	34,970

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 8: The Effect of SHCs on Student Absenteeism, Equation (1)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel C: Cohort 3				
Enrolled in school w/ SHC	0.0767***	0.0678***	0.0814***	0.0886***
	(0.00353)	(0.00357)	(0.00997)	(0.00991)
School Transition	0.0354***	0.0221***	0.0339***	0.0205***
	(0.00224)	(0.00230)	(0.00488)	(0.00495)
Female		-0.0702***		
		(0.00838)		
White		0.0155*		
		(0.00791)		
Eligible for FRL		0.122***		
		(0.00412)		
LEP		-0.0466***		
		(0.0144)		
School in rural locale		0.0306***		
		(0.00331)		
Number of crimes per 100 enrolled students		0.0211***		
		(0.000714)		
Percent of student body in poverty				0.413***
				(0.0933)
Squared form: Percent of student body in poverty				-0.694***
				(0.0799)
Constant	2.063***	1.985***		
	(0.00438)	(0.00811)		
Student fixed effects	No	No	Yes	Yes
Observations	148,915	146,430	145,573	145,256
Number of unique students	37,005	36,966	34,366	34,351

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 8: The Effect of SHCs on Student Absenteeism, Equation (1)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel D: Cohort 4				
Enrolled in school w/ SHC	0.0239***	0.00481	0.0276**	0.0365***
	(0.00559)	(0.00568)	(0.0136)	(0.0137)
School Transition	0.0857***	0.0472***	0.0831***	0.0614***
	(0.00316)	(0.00331)	(0.00613)	(0.00631)
Female		-0.0671***		
		(0.0106)		
White		0.145***		
		(0.0103)		
Eligible for FRL		0.154***		
		(0.00643)		
LEP		-0.190***		
		(0.0180)		
School in rural locale		0.00648		
		(0.00469)		
Number of crimes per 100 enrolled students		0.0514***		
		(0.00130)		
Percent of student body in poverty				1.308***
				(0.121)
Squared form: Percent of student body in poverty				-1.257***
				(0.0980)
Constant	1.922***	1.769***		
	(0.00556)	(0.0109)		
Student fixed effects	No	No	Yes	Yes
Observations	80,700	78,794	78,038	78,030
Number of unique students	22,700	22,607	20,755	20,753

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 8: The Effect of SHCs on Student Absenteeism, Equation (1)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel E: All Cohorts				
Enrolled in school w/ SHC	0.0979***	0.0918***	0.103***	0.105***
	(0.00172)	(0.00173)	(0.00502)	(0.00497)
School Transition	0.0228***	0.00109	0.0216***	0.00421
	(0.00110)	(0.00114)	(0.00249)	(0.00259)
Female		-0.0626***		
		(0.00437)		
White		0.0169***		
		(0.00419)		
Eligible for FRL		0.120***		
		(0.00198)		
LEP		-0.0450***		
		(0.00709)		
School in rural locale		0.0146***		
		(0.00170)		
Number of crimes per 100 enrolled students		0.0326***		
		(0.000358)		
Percent of student body in poverty				0.635***
				(0.0450)
Squared form: Percent of student body in poverty				-0.856***
				(0.0392)
Constant	2.082***	1.996***		
	(0.00384)	(0.00419)		
Student fixed effects	No	No	Yes	Yes
Observations	570,866	562,118	558,540	557,717
Number of unique students	134,954	134,753	125,200	125,178

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Appendix 8: Effect of SHCs on Student Absenteeism, Cohorts 2-4, Equation (2)

Table 9: The Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel B: Cohort 2				
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	0.0332	-0.00427	0.0603	0.0466
	(0.0622)	(0.0639)	(0.0624)	(0.0623)
Transitions from school with SHC to school without SHC	0.105***	0.0899***	0.113***	0.0976***
	(0.00745)	(0.00752)	(0.00761)	(0.00765)
Transitions between schools, both with SHCs	-0.103	-0.0456	-0.123*	-0.111*
	(0.0630)	(0.0647)	(0.0632)	(0.0632)
Transitions between schools, both lack SHCs	-0.0900***	-0.109***	-0.0943***	-0.108***
	(0.00236)	(0.00243)	(0.00238)	(0.00244)
Remains in same school, SHC in both years	0.00914	-0.0556	0.0467	0.0513
	(0.0621)	(0.0638)	(0.0623)	(0.0623)
Remains in same school, SHC introduced in second year	0.106*	0.150**	0.0898	0.0928
	(0.0620)	(0.0637)	(0.0622)	(0.0622)
Constant	2.174***	2.097***		
	(0.00704)	(0.00835)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	142,869	140,333	138,733	138,347
Number of unique students	39,738	39,699	36,217	36,187

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 9: The Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel C: Cohort 3				
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0937***	-0.0881***	-0.0909***	-0.107***
	(0.0166)	(0.0169)	(0.0169)	(0.0170)
Transitions from school with SHC to school without SHC	0.129***	0.121***	0.131***	0.120***
	(0.00880)	(0.00889)	(0.00901)	(0.00903)
Transitions between schools, both with SHCs	-0.119***	-0.107***	-0.111***	-0.0892***
	(0.0210)	(0.0213)	(0.0213)	(0.0214)
Transitions between schools, both lack SHCs	0.0085***	-0.00194	0.00364	-0.0077***
	(0.00262)	(0.00268)	(0.00264)	(0.00266)
Remains in same school, SHC in both years	-0.0223	-0.0253	-0.0114	-0.0219
	(0.0162)	(0.0165)	(0.0165)	(0.0165)
Remains in same school, SHC introduced in second year	0.136***	0.123***	0.140***	0.153***
	(0.0155)	(0.0158)	(0.0158)	(0.0158)
Constant	2.082***	1.963***		
	(0.00451)	(0.00869)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	126,412	124,132	122,076	121,749
Number of unique students	39,166	39,086	35,721	35,684

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 9: The Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2a) daysabs	(3) daysabs	(4) daysabs
Panel D: Cohort 4				
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0154	-0.0134	-0.00529	0.0178
	(0.0242)	(0.0244)	(0.0246)	(0.0246)
Transitions from school with SHC to school without SHC	0.0397***	0.0186	0.0350**	0.0179
	(0.0149)	(0.0151)	(0.0153)	(0.0153)
Transitions between schools, both with SHCs	-0.000939	0.0275	-0.00467	-0.00536
	(0.0345)	(0.0348)	(0.0351)	(0.0351)
Transitions between schools, both lack SHCs	0.0200***	0.000150	0.0158***	0.000186
	(0.00351)	(0.00364)	(0.00356)	(0.00360)
Remains in same school, SHC in both years	0.0107	-0.0114	0.0223	0.0354
	(0.0240)	(0.0242)	(0.0245)	(0.0245)
Remains in same school, SHC introduced in second year	-0.00174	-0.0147	-0.00250	-0.0151
	(0.0228)	(0.0230)	(0.0232)	(0.0232)
Constant	1.998***	1.816***		
	(0.00563)	(0.0115)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	67,975	66,804	64,701	64,698
Number of unique students	24,072	24,031	21,468	21,467

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 9: The Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2a) daysabs	(3) daysabs	(4) daysabs
Panel E: All Cohorts				
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0307***	-0.0189*	-0.0283***	-0.0245**
	(0.0103)	(0.0104)	(0.0104)	(0.0104)
Transitions from school with SHC to school without SHC	0.113***	0.100***	0.116***	0.102***
	(0.00415)	(0.00419)	(0.00424)	(0.00425)
Transitions between schools, both with SHCs	-0.0981***	-0.0941***	-0.0934***	-0.0940***
	(0.0118)	(0.0120)	(0.0120)	(0.0120)
Transitions between schools, both lack SHCs	-0.0360***	-0.0514***	-0.0406***	-0.0547***
	(0.00129)	(0.00132)	(0.00130)	(0.00132)
Remains in same school, SHC in both years	-0.0107	-0.0124	-0.00182	0.00704
	(0.0101)	(0.0103)	(0.0103)	(0.0103)
Remains in same school, SHC introduced in second year	0.131***	0.117***	0.137***	0.128***
	(0.00992)	(0.0101)	(0.0100)	(0.0100)
Constant	2.125***	2.028***		
	(0.00375)	(0.00441)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	493,095	485,342	477,130	476,284
Number of unique students	142,647	142,460	129,483	129,413

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Appendix 9: Distributional Effect of SHCs on Student Absenteeism, Cohorts 2 – 4

Table 10: The Distributional Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel B: Cohort 2	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0802	-0.00731	-0.391***	-0.337***
	(0.0659)	(0.0641)	(0.0964)	(0.0988)
Transitions from school with SHC to school without SHC	0.111***	0.138***	0.0441***	0.0701***
	(0.00903)	(0.00920)	(0.0137)	(0.0160)
Transitions between schools, both with SHCs	0.0225	-0.0663	0.328***	0.258**
	(0.0672)	(0.0654)	(0.0994)	(0.103)
Transitions between schools, both lack SHCs	-0.0639***	-0.0433***	0.00709	0.0120**
	(0.00323)	(0.00319)	(0.00506)	(0.00546)
Remains in same school, SHC in both years	-0.113*	-0.00351	-0.448***	-0.360***
	(0.0659)	(0.0641)	(0.0963)	(0.0990)
Remains in same school, SHC introduced in second year	0.227***	0.161**	0.524***	0.509***
	(0.0657)	(0.0638)	(0.0958)	(0.0981)
Constant	2.258***		3.390***	
	(0.00933)		(0.0101)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	73,530	69,977	11,622	7,347
Number of unique students	24,150	19,571	7,318	2,958

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 10: The Distributional Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel C: Cohort 3	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0941***	-0.102***	-0.0363	-0.0111
	(0.0214)	(0.0213)	(0.0401)	(0.0455)
Transitions from school with SHC to school without SHC	0.148***	0.160***	0.0544***	0.0925***
	(0.0108)	(0.0110)	(0.0161)	(0.0193)
Transitions between schools, both with SHCs	-0.0953***	-0.0880***	0.0230	-0.0173
	(0.0265)	(0.0266)	(0.0480)	(0.0549)
Transitions between schools, both lack SHCs	-0.00395	-0.00481	-0.0363***	-0.0467***
	(0.00350)	(0.00347)	(0.00583)	(0.00643)
Remains in same school, SHC in both years	-0.0180	-0.0130	0.0223	0.0869*
	(0.0208)	(0.0208)	(0.0393)	(0.0451)
Remains in same school, SHC introduced in second year	0.112***	0.136***	0.108***	0.117***
	(0.0200)	(0.0199)	(0.0382)	(0.0430)
Constant	2.176***		3.371***	
	(0.00934)		(0.0115)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	67,382	63,981	9,395	5,755
Number of unique students	24,097	19,832	6,136	2,413

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 10: The Distributional Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel D: Cohort 4	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0308	-0.0238	0.0767	0.0836
	(0.0291)	(0.0295)	(0.0567)	(0.0700)
Transitions from school with SHC to school without SHC	0.0179	0.0438***	0.0675**	0.129***
	(0.0166)	(0.0169)	(0.0287)	(0.0355)
Transitions between schools, both with SHCs	0.0542	0.0170	-0.147**	-0.227**
	(0.0403)	(0.0408)	(0.0748)	(0.0908)
Transitions between schools, both lack SHCs	-0.000948	0.0183***	-0.00961	-0.0109
	(0.00458)	(0.00449)	(0.00846)	(0.00972)
Remains in same school, SHC in both years	-0.0265	0.0179	0.0203	0.0340
	(0.0289)	(0.0293)	(0.0562)	(0.0705)
Remains in same school, SHC introduced in second year	-0.00538	0.0133	-0.0381	-0.0121
	(0.0275)	(0.0278)	(0.0536)	(0.0659)
Constant	2.031***		3.331***	
	(0.0119)		(0.0167)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	40,222	38,085	4,085	2,261
Number of unique students	15,880	13,147	2,833	988

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 10: The Distributional Effect of SHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel E: All Cohorts	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SHC to school with SHC	-0.0309**	-0.0499***	-0.0496**	-0.0611**
	(0.0133)	(0.0132)	(0.0241)	(0.0268)
Transitions from school with SHC to school without SHC	0.122***	0.144***	0.0793***	0.126***
	(0.00502)	(0.00510)	(0.00753)	(0.00878)
Transitions between schools, both with SHCs	-0.0891***	-0.0854***	-0.0689**	-0.104***
	(0.0151)	(0.0151)	(0.0270)	(0.0303)
Transitions between schools, both lack SHCs	-0.0341***	-0.0220***	-0.0093***	-0.0105***
	(0.00175)	(0.00173)	(0.00277)	(0.00302)
Remains in same school, SHC in both years	-0.0158	-0.0138	-0.0320	-0.00575
	(0.0131)	(0.0130)	(0.0239)	(0.0266)
Remains in same school, SHC introduced in second year	0.132***	0.163***	0.141***	0.190***
	(0.0128)	(0.0127)	(0.0235)	(0.0260)
Constant	2.205***		3.381***	
	(0.00488)		(0.00539)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	256,967	243,846	38,858	24,537
Number of unique students	87,447	71,319	24,512	9,915

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Appendix 11: Effect of SBHCs on Student Absenteeism

Table 11: Effect of SBHCs on Student Absenteeism, Equation (2)

VARIABLES	(1) daysabs	(2) daysabs	(3) daysabs	(4) daysabs
Panel E: All Cohorts				
Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SBHC to school with SBHC	-0.0834***	-0.0597***	-0.0732***	-0.0727***
	(0.0125)	(0.0128)	(0.0127)	(0.0127)
Transitions from school with SBHC to school without SBHC	0.0964***	0.0859***	0.101***	0.0968***
	(0.00476)	(0.00481)	(0.00487)	(0.00488)
Transitions between schools, both with SBHCs	-0.0595***	-0.0658***	-0.0640***	-0.0694***
	(0.0141)	(0.0144)	(0.0143)	(0.0143)
Transitions between schools, both lack SBHCs	-0.0332***	-0.0490***	-0.0385***	-0.0535***
	(0.00135)	(0.00139)	(0.00137)	(0.00139)
Remains in same school, SBHC in both years	-0.0619***	-0.0547***	-0.0473***	-0.0410***
	(0.0124)	(0.0126)	(0.0125)	(0.0125)
Remains in same school, SBHC introduced in second year	0.205***	0.185***	0.205***	0.202***
	(0.0121)	(0.0124)	(0.0122)	(0.0122)
Constant	2.109***	2.012***		
	(0.00242)	(0.00459)		
Individual level controls	No	Yes	No	No
School level controls	No	Yes	No	Yes
Student fixed effects	No	No	Yes	Yes
Observations	443,352	436,042	417,171	416,313
Number of unique students	137,845	137,522	114,191	114,102

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 11b: Distributional Effect of SBHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel A: Cohort 1	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SBHC to school with SBHC	-0.144***	-0.110***	-0.202***	-0.182***
	(0.0249)	(0.0256)	(0.0447)	(0.0420)
Transitions from school with SBHC to school without SBHC	0.144***	0.123***	0.156***	0.0971***
	(0.00952)	(0.00941)	(0.0157)	(0.0138)
Transitions between schools, both with SBHCs	-0.0201	-0.0358	-0.0703	-0.0114
	(0.0284)	(0.0289)	(0.0512)	(0.0472)
Transitions between schools, both lack SBHCs	-0.0281***	-0.0407***	-0.00341	-0.00403
	(0.00325)	(0.00328)	(0.00519)	(0.00483)
Remains in same school, SBHC in both years	-0.122***	-0.103***	-0.0923**	-0.110***
	(0.0244)	(0.0251)	(0.0442)	(0.0413)
Remains in same school, SBHC introduced in second year	0.312***	0.276***	0.300***	0.244***
	(0.0238)	(0.0246)	(0.0429)	(0.0407)
Constant	2.274***		3.420***	
	(0.00966)		(0.0201)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	63,158	68,168	7,675	11,998
Number of unique students	16,766	22,270	2,997	7,376

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.

Table 11b: Distributional Effect of SBHCs on Student Absenteeism, Equation (2)

VARIABLES	(5) daysabs	(6) daysabs	(7) daysabs	(8) daysabs
Panel E: All Cohorts	FRL only	FRL only	>20 daysabs	>20 daysabs
Remains in same school with no SBHC	Base	Base	Base	Base
Transitions from school without SBHC to school with SBHC	-0.108***	-0.0809***	-0.0984***	-0.0950***
	(0.0158)	(0.0161)	(0.0287)	(0.0263)
Transitions from school with SBHC to school without SBHC	0.125***	0.104***	0.135***	0.0818***
	(0.00584)	(0.00574)	(0.0103)	(0.00884)
Transitions between schools, both with SBHCs	-0.0386**	-0.0470***	-0.102***	-0.0459
	(0.0178)	(0.0180)	(0.0331)	(0.0298)
Transitions between schools, both lack SBHCs	-0.0194***	-0.0316***	-0.0081**	-0.0069**
	(0.00180)	(0.00182)	(0.00318)	(0.00292)
Remains in same school, SBHC in both years	-0.0673***	-0.0611***	-0.0249	-0.0601**
	(0.0156)	(0.0159)	(0.0285)	(0.0259)
Remains in same school, SBHC introduced in second year	0.234***	0.199***	0.214***	0.177***
	(0.0153)	(0.0156)	(0.0276)	(0.0254)
Constant	2.190***		3.407***	
	(0.00508)		(0.0116)	
Individual level controls	Yes	No	Yes	No
School level controls	Yes	No	Yes	No
Student fixed effects	No	Yes	No	Yes
Observations	215,597	232,922	20,771	34,118
Number of unique students	63,612	83,743	8,420	21,969

*** p<0.01, ** p<0.05, * p<0.1

Note: Where indicated, models include individual level controls for the gender, race, FRL status, and LEP status, and school level controls for geographic locale of school, number of crimes per 100 enrolled students, and percent of the student population living in poverty.